ORDER NO. KM68906279C1
F4

Service Manual

Personal Word Processor

KX-W1000

Panasonic

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Division of Matsushita Electric
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Service Manual

Supplement - 1

Personal Word Processor

KX-W1000

PERSONAL WORD PROCESSOR

Please use this manual together with the service manual for model no. KX-W1000, order no. KM68906279C1.

IMPORTANT

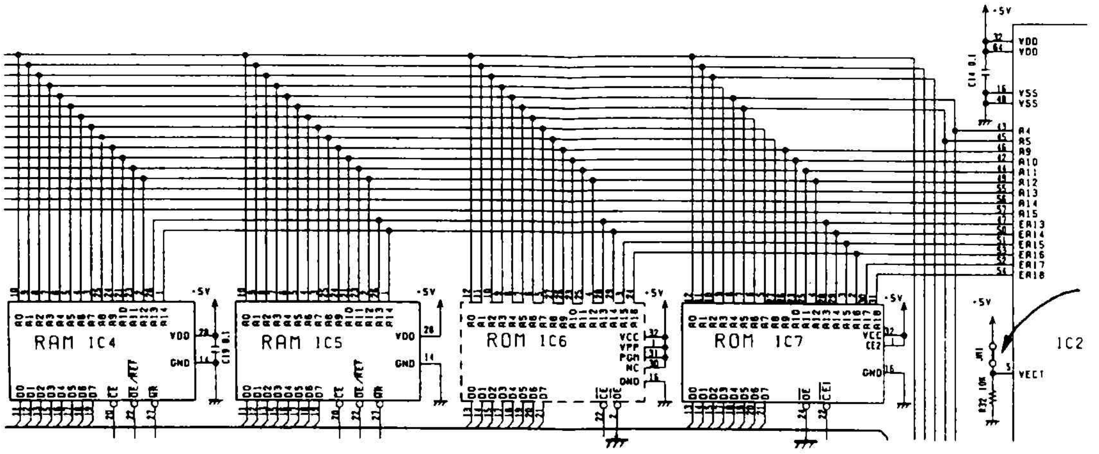
Subject: Integration of ROM, addition of parts and corrections.

□□□□ D □□□□□□

Serial No. — Suffix

ROM(IC6) has been eliminated and its program has been integrated into Mask ROM(IC7) from Suffix "D".

■ Logic Board Schematic (Page 6-7)



Added

IC6 is eliminated and JM1 is added.

■ Replacement Parts List

Page	Ref. No.	Parts No.		Parts Name and Description	Per Set	Remarks
		Original	New			
7-2	1-21	XTW3+10S	XTW3+10S	Screw 3×10 mm	22 → 18	
7-2	1-25	———	PJHG717Z	Rubber Cushion	4	
7-2	1-26	———	XTW3+12S	Screw 3×12 mm	4	
7-12	IC6	PJWI2W1000M	———	None	0	
7-12	IC7	PJWI1W1000M	PJWIW1000M	IC ROM	1	
7-12	RA2	ERBP88103K	EXBP88103K	Resistor Array (10K×8)	1	

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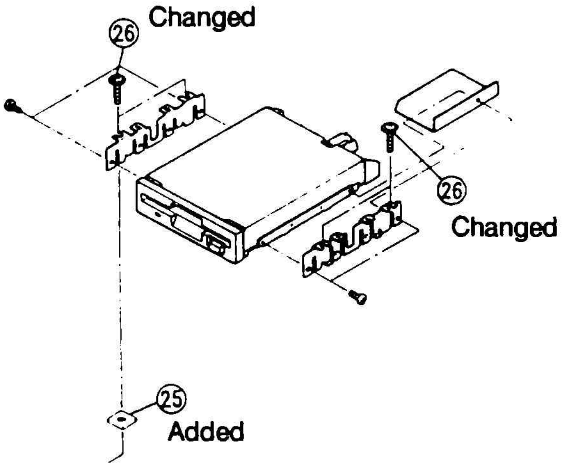
Parts Location (Page 7-1)

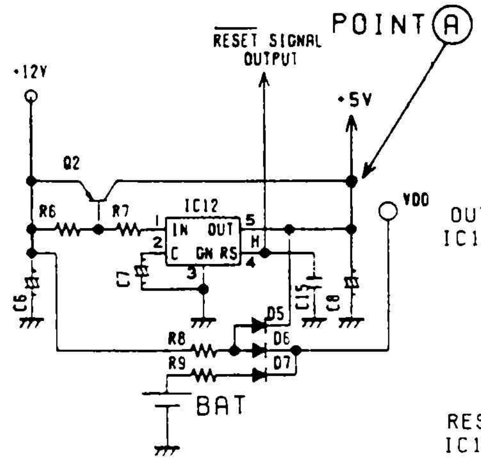


Correction

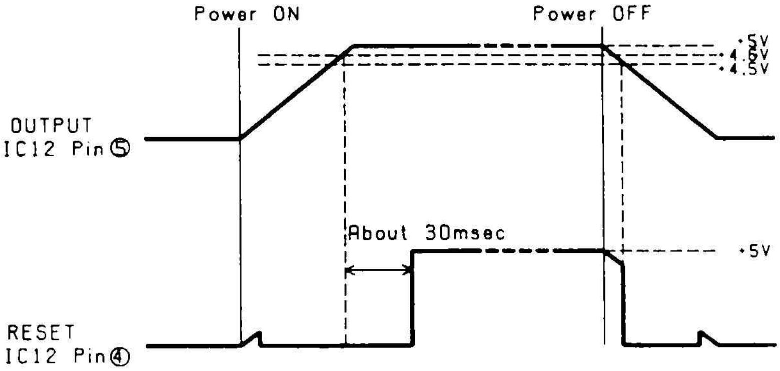
Please correct the service manual with following information.

4.2 Power Supply

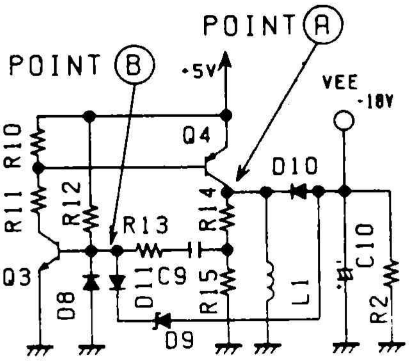
b) +5 V Power Supply and Reset Circuit

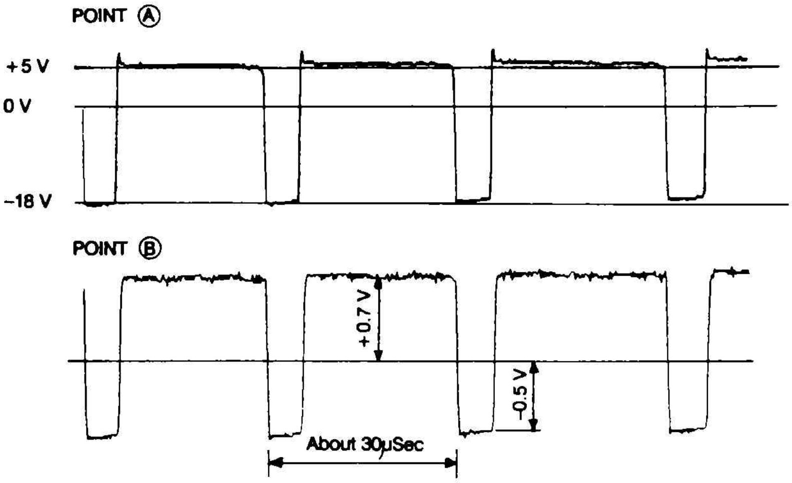


Timing Chart



c) −18 V Power Supply





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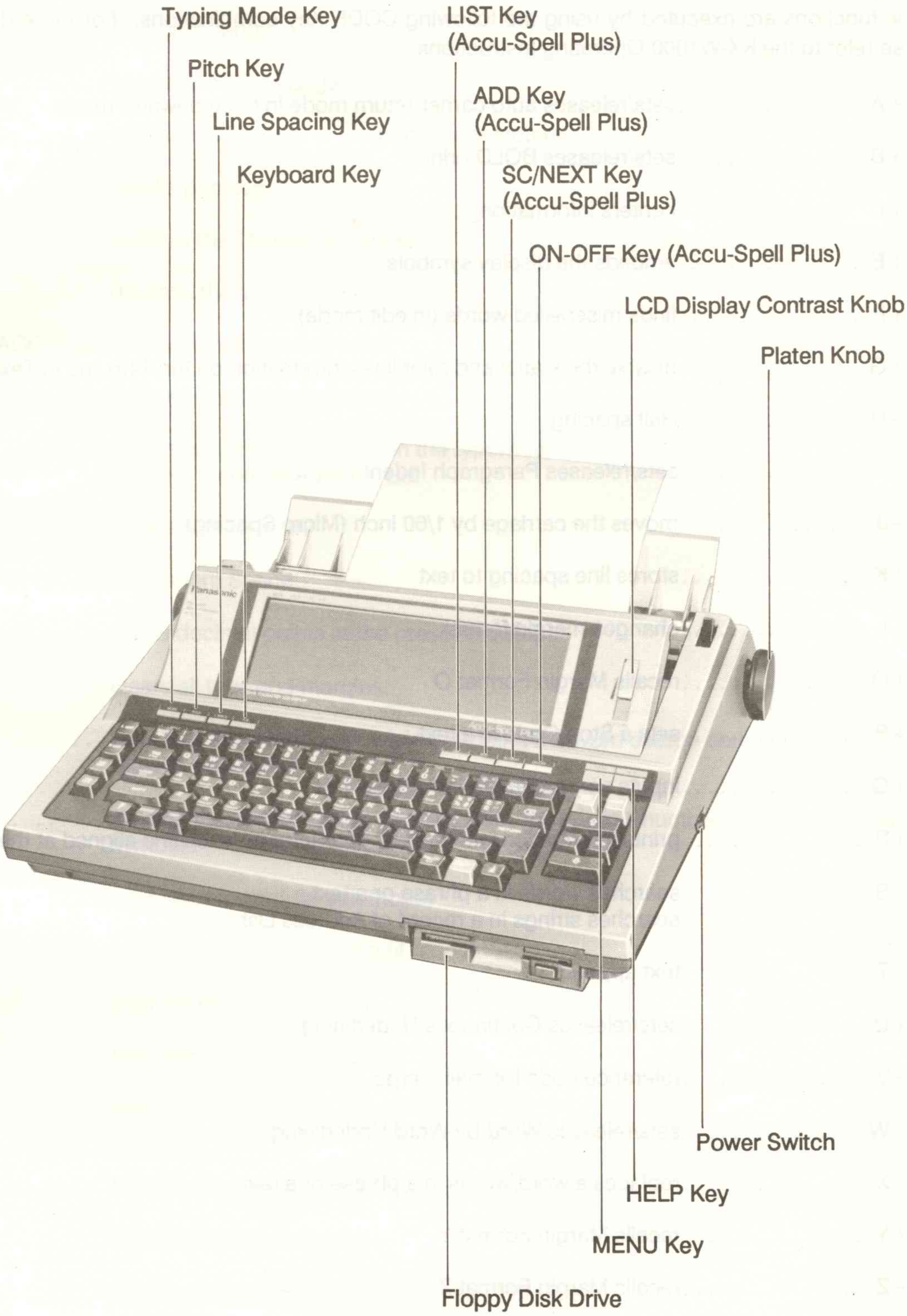
1. General Information

1.1 Specifications

Print Unit	Print Speed	12 cps
	Print Element	Cassette type Daisywheel (Mono Plastic) 96 characters
	Typing Pitch	10, 12, 15
	Line Spacing	1, $1^1/_2$, 2
	Paper Width	12" (304 mm)
	Writing Line	10" (254 mm)
	Paper Capacity	Original + 1
	Ribbon Cassette	Correctable, Fabric (Option)
	Correction Tape	Lift-off, Cover-up (Option)
Keyboard		45 Alpha/Numeric keys
Memory	Correction Memory	1 line
	Address List/Phrase/Text Memory	50,000 characters
	Line Formats	1 format
	Battery Backup	Approx. 5 years (User, Phrase, Margin)
Accu-Spell Plus	Basic Dictionary	63,000 words
	User Dictionary	120 words
Thesaurus	Dictionary	45,000 words
Display	Type	480 × 128 dot matrix LCD
	Number of chrs.	80 character × 14 line
Floppy Disk Drive		Built in 3.5" floppy disk drive (353KB)
Power Requirements	Voltage	120 V ± 10%
	Frequency	60 Hz
	Power Consumption	35 W
Operating Conditions	Temperature	5°C (41°F) to 35°C (95°F)
	Humidity	20% ~ 80% RH
Dimensions		17" (W) × 15 $^9/_{16}$" (D) × 4 $^5/_8$" (H) (432 × 395 × 118 mm)
Weight		Approx. 14 $^5/_{16}$ lbs. (6.5 kg)

Specifications are subject to change without notice.

1.2 Function Key Location


Typing Mode Key
Pitch Key
Line Spacing Key
Keyboard Key
LIST Key (Accu-Spell Plus)
ADD Key (Accu-Spell Plus)
SC/NEXT Key (Accu-Spell Plus)
ON-OFF Key (Accu-Spell Plus)
LCD Display Contrast Knob
Platen Knob
Power Switch
HELP Key
MENU Key
Floppy Disk Drive

1.3 List of Key Functions

The KX-W1000 Personal Word Processor has many functions for user operations and service operations.

a) User operations
These functions are executed by using the following CODE Key combinations. For more detailed information please refer to the KX-W1000 Operating Instructions.

CODE + A .... sets/releases auto carrier return mode in the typewriter mode

CODE + B .... sets/releases BOLD print

CODE + C .... centers information

CODE + E .... embeds the display symbols

CODE + F .... finds misspelled words (in edit mode)

CODE + G .... disable the status and ruler lines information on the 14th line in Text edit mode

CODE + H .... Half spacing

CODE + I .... sets/releases Paragraph Indent

CODE + J .... moves the carriage by 1/60 inch (Micro Spacing)

CODE + K .... stores line spacing to text

CODE + L .... changes margin format

CODE + O .... recalls Margin Format O

CODE + P .... sets a Stop Code in a text

CODE + Q .... inputs sort rectangle in Address List

CODE + R .... prints information with the last character on each line aligned at the right margin

CODE + S .... searches words in a phrase or a text
searches strings in a record of Address List

CODE + T .... text append

CODE + U .... sets/releases Continuous Underlining

CODE + V .... reference code for mail merge

CODE + W .... sets/releases Word by Word Underlining

CODE + X .... replaces a word/words in a phrase or a text

CODE + Y .... recalls Margin Format Y

CODE + Z .... recalls Margin Format Z

CODE + 1 .... sets/releases the insert/over typing

CODE + 2 .... moves information block in a phrase or a text

CODE + 3	copies information block in a phrase or a text
CODE + 4	deletes information block in a phrase or a text
CODE + 5	sets page break
CODE + 6	sets page length
CODE + 7	jumps to desired page
CODE + 8	controls the impact of the printed characters
CODE + 9	recalls phrases
CODE + 0	enables the Thesaurus feature
CODE + MAR REL	displays the layout of text
CODE + BACK SPACE	reverse word by word scroll
CODE + FWD	forward word by word scroll
CODE + ⌫	makes correction manually in the typewriter mode delete a record in Address List
CODE + – (Hyphen)	Permanent Hyphen
CODE + SPACE BAR	Permanent Space
CODE + TAB	aligns decimal points at the preset tab stops
CODE + TAB CLR	clears all tabs and margins
CODE + RETURN	searches the return mark while executing the word search command or the word replace command
CODE + LOCK	Presets the unit for typing capital letters, lower case numbers, punctuation marks symbols
CODE + ⤓	next search word (in edit mode)
CODE + ⤒	previous search word (in edit mode)
CODE + RELOC EXP	express return
CODE + ?	Mail Merge recorder header
CODE + NEXT PAGE	scrolls to the previous page scrolls to the previous RECORD of Address List
CODE + ⇑	scrolls to the previous display
CODE + ⇓	scrolls to the next display
CODE + ⇐	advance the cursor to the beginning of the line
CODE + ⇒	advance the cursor to the end of the line
CODE + QUICK ERASE	deletes one line at a time

b) Service operations

The following functions support service and are accessed by turning ON the Power Switch while pressing the INDEX (⤒) Key and the T Key. Before executing the service mode, insert paper in the printer to print results.

KX-W1000 TEST MODE

1. KEY Check (OUT)
2. KEY Check (IN)
3. ROM/RAM Check
4. LCD Check
5. FORMAT Check
6. FDD R/W Check

1.Keyboard Check (OUT)

This mode is used for checking the outer keys of the Keyboard, as shown below.

1) Press the number 1 key to execute the outer key check.
2) After the machine displays "TESTING... OUT", press each of the keys in the outside groups① to④, in order.
3) The results of the test are displayed as follows. When an abnormal condition exists, the result will be displayed in the LCD with a 0 or 1. 0 indicates an abnormal key, 1 indicates a normal key. If 0 appears in the chart, exit this mode by pressing the RETURN key, and refer to the matrix chart on the next page to determine which key is abnormal. Repair or replace the abnormal key.

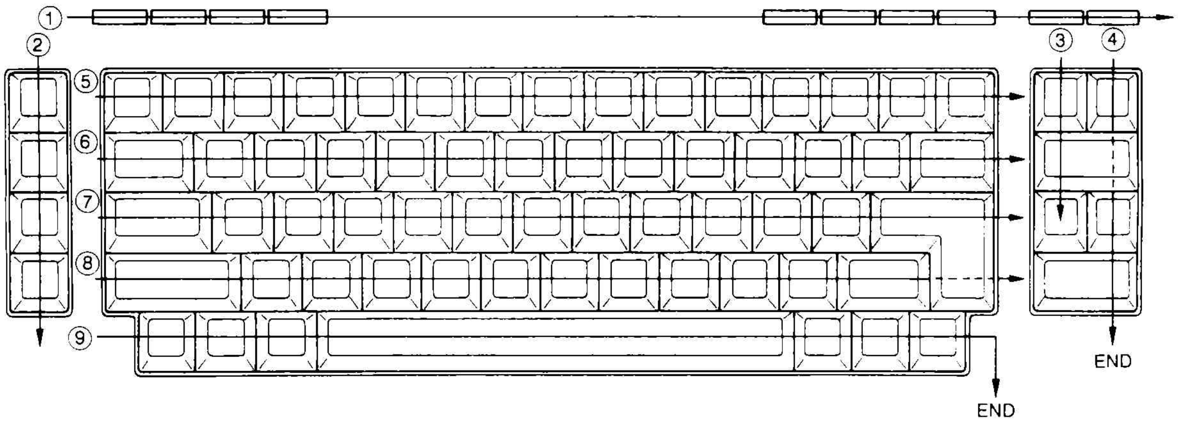
RESULT OUTPUT	NORMAL	ABNORMAL
LCD	KEY OUT OK	Check KEY OUT
PRINTER	KEY OUT OK	Check KEY OUT

2. Keyboard Check (IN)

This mode is used for checking the inner keys of the Keyboard, as shown below.

1) Press the number 2 key to execute the inner key check.
2) After the machine displays "TESTING... IN", press each of the keys in the inside groups⑤ to ⑨, in order.
3) The results of the test are displayed as follows. When an abnormal condition exists, the result will be displayed in the LCD with a 0 or 1. 0 indicates an abnormal key, 1 indicates a normal key. If 0 appears in the chart, exit this mode by pressing the RETURN key, and refer to the matrix chart on the next page to determine which key is abnormal. Repair or replace the abnormal key.

RESULT OUTPUT	NORMAL	ABNORMAL
LCD	KEY IN OK	Check KEY IN
PRINTER	KEY IN OK	Check KEY IN



Key Matrix Chart

Example

Abnormal →

```
0 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1
```

⤓	1/2	£	P	;	QUICK ERASE	RETURN	TAB CLR
SPACE	'	.		SHIFT (R)	⇨	/	RELOC EXP
CODE	0	O	I	K	⤒	LOCK	—
C	TAB D TAB	N	Y	SHIFT (L)	M	Z	V
MAR REL	W	Q	A	D	B	H	3
2	L MAR	1	S	R MAR	TAB SET	X	RPT
7	4	U	T	G	,	J	8
FWD	5	BACK SPACE	E	R	⇧	F	PRINT
=	9	6	X	⇦	⇩	L	NEXT PAGE
			MODE	LINE SP	LIST	SC/NEXT	MENU
			PITCH	KB	ADD	ON/OFF	HELP

3. ROM/RAM Check

This mode is used for checking the ROM/RAM.

1) Press the number 3 key to execute the ROM/RAM check.

2) The results of test are displayed as follows:

RESULT OUTPUT	NORMAL	ABNORMAL
LCD	ROM/RAM OK	Check ROM Check DRAM Check SRAM
PRINTER	ROM/RAM OK	Check ROM/RAM

4. LCD Check

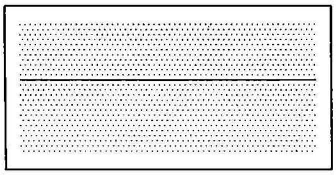
This mode is used for checking LCD.

1) Press the number 4 key to execute the LCD check.

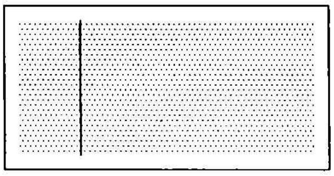
2) If the display is not clear, adjust the contrast control.

3) Observe the close hatch pattern on the LCD. If a horizontal or vertical line appears, the LCD is defective.

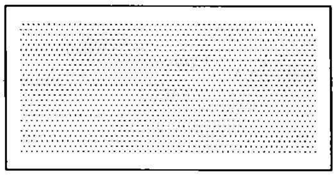
4) Press the RETURN key to exit from this mode. "LCD" will be printed on the paper.



ABNORMAL



ABNORMAL



NORMAL

5. FORMAT Check

This mode is used to check the Disk Format.

1) Press the number 5 key to execute the Disk Format check.
2) The program automatically formats the floppy disk. The results of test are displayed as follows.

RESULT OUTPUT	NORMAL	ABNORMAL
LCD	FORMAT OK	Check FORMAT Check PROTECT Check NO DISK Check DISK
PRINTER	FORMAT OK	Check FORMAT

6. FDD R/W Check

This mode is used to check the FDD read and write functions.

1) Press the number 6 key to execute the FDD R/W check.
2) The program automatically writes test data to tracks 0,40 and 79 on the disk and reads the data then checks whether the data is correct or not. The results of test are displayed as follows:

RESULT OUTPUT	NORMAL	ABNORMAL
LCD	FDD R/W OK	Check WRITE Check READ Check PROTECT Check NO DISK Check DISK
PRINTER	FDD R/W OK	Check FDD R/W

Note:

Formatted disk is required for testing.

7. Other Functions

The following functions are executed by turning ON the Power Switch while pressing the Key combinations shown below.

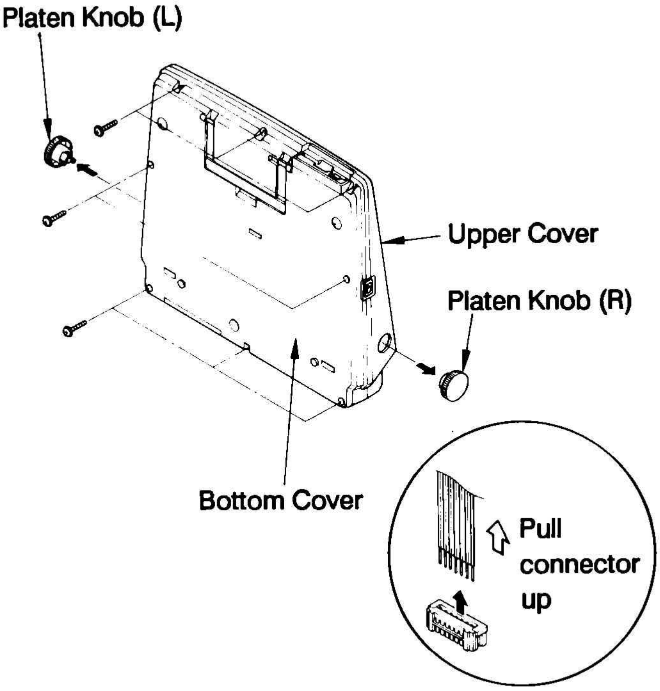
		Display Message
SHIFT + RPT	Daisy home position is adjusted	"DAISY ADJ."
RELOC + QUICK ERASE	Test data printing	"TEST PRINTING"
SHIFT	Demonstration	*No message
SHIFT + CODE	Clears all tabs, margin and RAM	No message

* Pressing PRINT key performs demonstration print.

2. Removal and Replacement Procedures

For reasons of safety and to avoid possible damage to electronic components, the AC Line Cord must be removed before disassembly.

2.1 Upper Cover



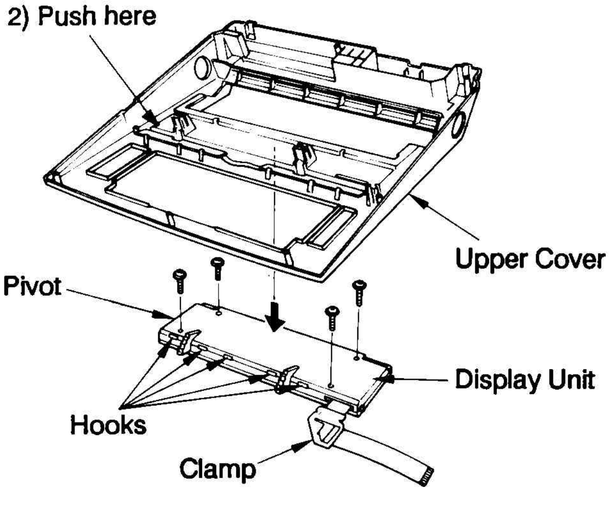
1) Remove the Platen knobs from both sides of the Platen by pulling them outward.
2) Remove 3 screws from beneath the front edge of the Bottom Cover, 2 screws from the middle of the Bottom Cover and 3 screws from the lower.
3) Carefully lift and remove the Upper Cover while observing the right side of the Platen shaft.
4) Unplug the LCD Display flat cable CN7 and the Selector Keys flat cable CN8 from the Main Logic Board by lifting up the Upper Cover from the Bottom Cover.

Important Note:
Special clamping connectors are used for the Selector Keys flat cable CN8. To avoid cable damage, release clamp by pulling away from Board, as illustrated, when removing the flat cable. When reinstalling the flat cable, insert it and then push clamp fully toward Board.

Replace in the reverse order.

Note:
When reinstalling the Upper Cover, install the right side first. Be careful to line up the Paper Release Lever and the right side of the Platen to the respective openings.

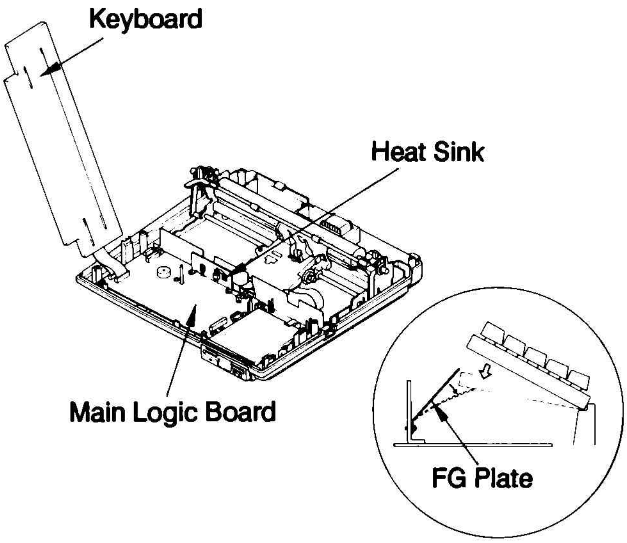
2.2 Display Unit



1) Reverse the Upper Cover and release the flat cable clamp from the Upper Cover.
2) Push in the Pivot located on the LCD Contrast Knob side and remove the Display Unit from the Upper Cover.
3) Remove the 4 screws from the LCD Rear Cover.
4) Carefully remove the LCD Front Cover Assembly by releasing the five hooks and opening the LCD Front Cover Assembly from hook side.
5) Unplug the flat cable from LCD Board and lift out the Display Unit Complete with the Contrast Board.

Replace in the reverse order.

Note:
When reinstalling LCD Front Cover Assembly, be sure to align the contrast control knob with the contrast control potentiometer.

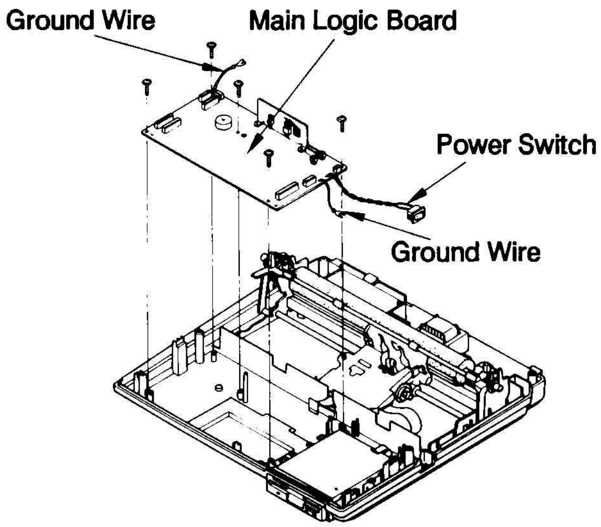


2.3 Keyboard

1) Lift the Keyboard up and to the left.
2) Unplug the Keyboard flat cables CN5 and CN6 from the Main Logic Board.

Replace in the reverse order.

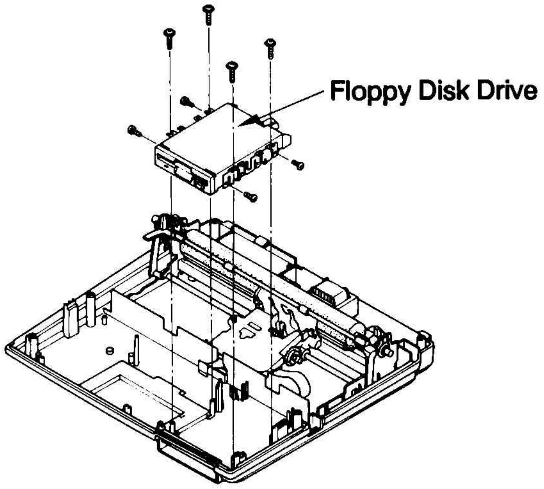
Note:
When reinstalling the Keyboard, slightly lower the FG Plate and correct it by Keyboard.



2.4 Main Logic Board

1) Remove 2 ground wire screws.
2) Unplug the Power Transformer connector CN1, the Carrier Spacing Motor connector CN2, the Paper Feed Motor connector CN4, the Carrier flat cable CN3 and the FDD flat cable CN9 from the Main Logic Board.
3) Remove the 5 screws (⊲⊖) and lift out the Main Logic Board with the Power Switch.

Replace in the reverse order.



2.5 Floppy Disk Drive

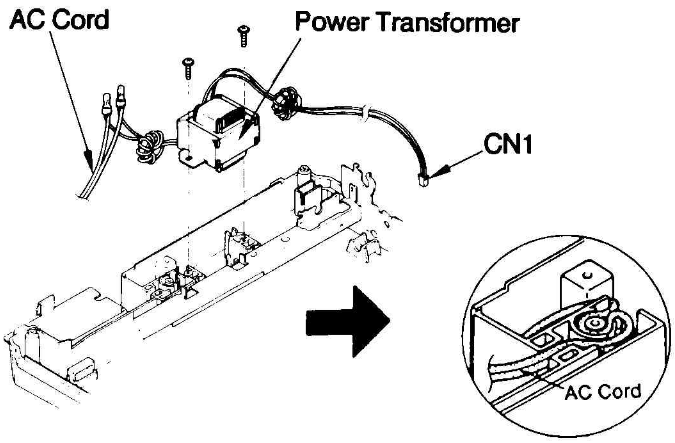
1) Remove the 4 screws from the Bottom Cover.
2) Carefully raise the Floppy Disk Drive from the Bottom Cover and remove.
3) Remove the 4 screws from the FDD Plate.

For more detail, please refer to the section 5.

Replace in the reverse order.

Note:
Connecter CN9 must be unplugged before lifting the Floppy Disk Drive.

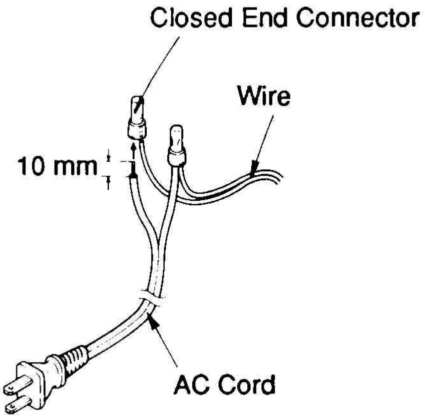
2.6 Transformer and AC power Cord



1) Remove the 2 screws from the Power Transformer.
2) Release the AC Cord from the Bottom Cover.
3) Remove the Power Transformer with AC Cord.

Replace in the reverse order.

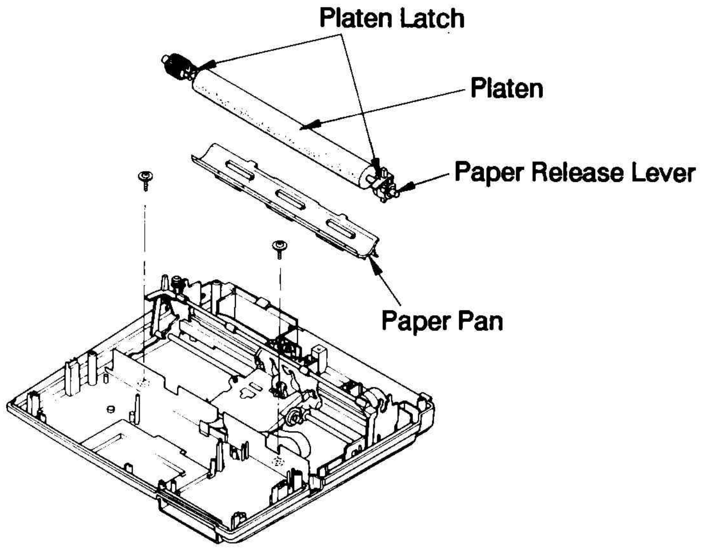
Note:
When replacing the AC Cord, make sure that it is routed as shown in the illustration.



Safety Notice:
When replacing the Power Transformer and AC Cord, please follow the procedure below.

1) Carefully strip the lead ends and twist the wires together.
2) Fully insert the wire end into the closed end connector (Crimp-ON Type).
3) Firmly crimp the connector with appropriate tool.

2.7 Chassis



1) Pull the right Paper Release Lever and remove the Platen by rotating the Platen Latches toward the front of the unit then lift the Platen from the Chassis.
2) Remove the Paper Pan.
3) Remove the 2 screws from the Chassis.
4) The Chassis can be removed.

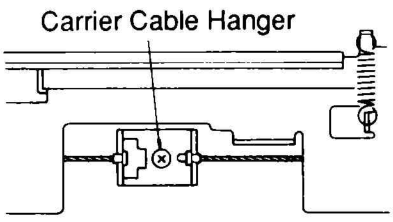
Replace in the reverse order.

Note:
Connectors CN2, CN3 and CN4 must be unplugged before lifting the Chassis.
(refer to section 2.4)

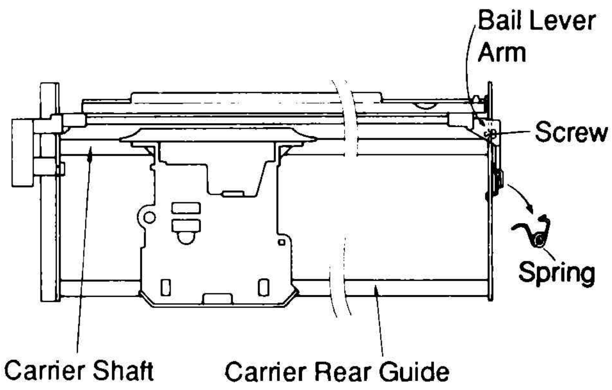
2.8 Carrier

1) Unplug the flat cable from the Carrier.
2) Position the Carrier in front of the left side rear frame opening.
3) Remove the screw from the Carrier Cable Hanger.
4) Remove the screw from the right side frame.
5) Remove the spring from the right Bail Lever Arm.
6) Carefully move the Bail Lever Arm away from the end of the Carrier Shaft.
7) Carefully slide the Carrier Shaft to the right.
8) Remove the Carrier.

Replace in the reverse order.



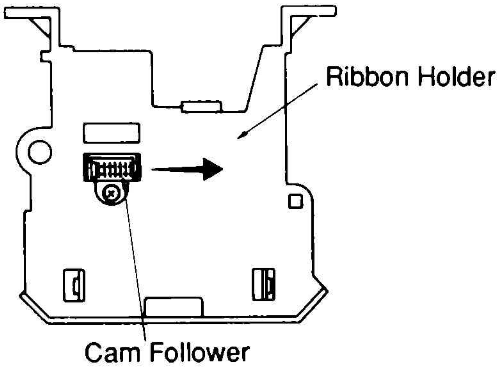
(Rear View)



2.9 Ribbon Holder

1) Pull the Cam Follower out of the groove in the Drive Cam.
2) Slightly slide the Ribbon Holder to the right and remove it upward.

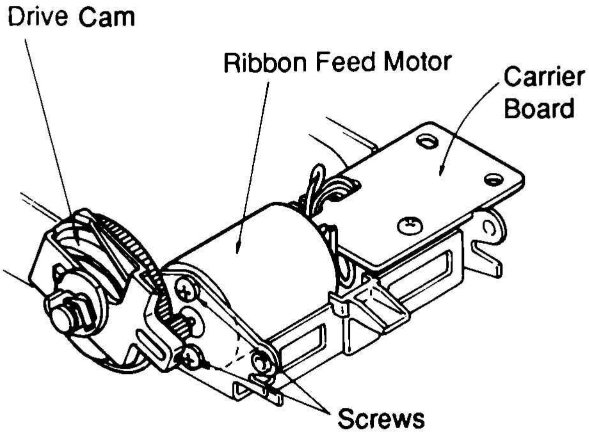
Replace in the reverse order.

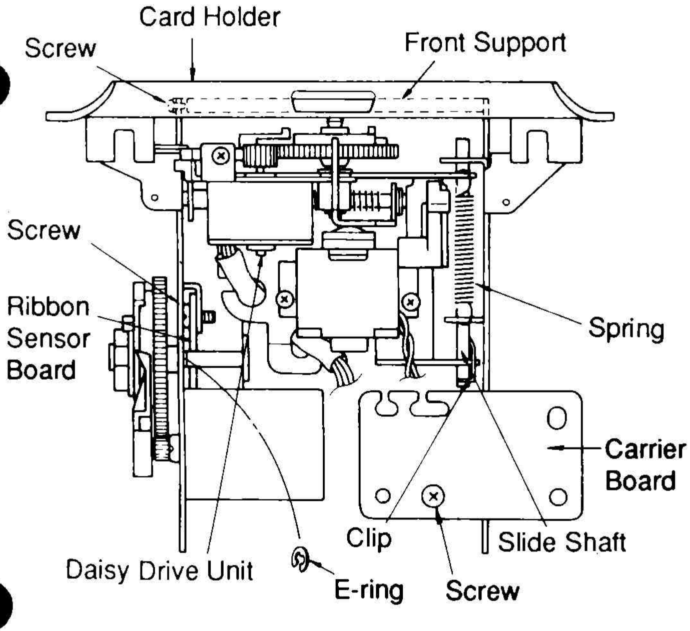


2.10 Ribbon Feed Motor

1) Unsolder the Motor leads from the Ribbon Feed Motor.
2) Remove the 2 screws from the Motor.

Replace in the reverse order.

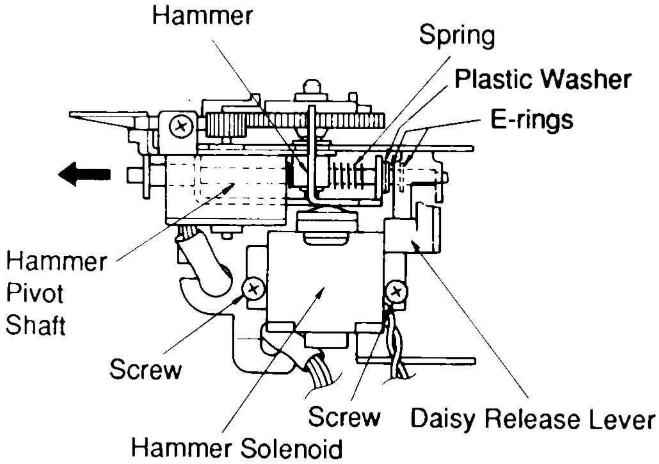




2.11 Daisy Drive Unit

1) Remove the Front Support and the Card Holder by removing the screw.
2) Remove the E-ring and the Drive Cam.
3) Remove the screw from the Ribbon Sensor Board.
4) Remove the screw from the Carrier Board.
5) Remove the spring.
6) Remove the Clip from the Slide Shaft.
7) Remove the Slide Shaft by pulling it to the front.
8) Carefully lift off the Daisy Drive Unit, Carrier Board and Ribbon Sensor Board together.

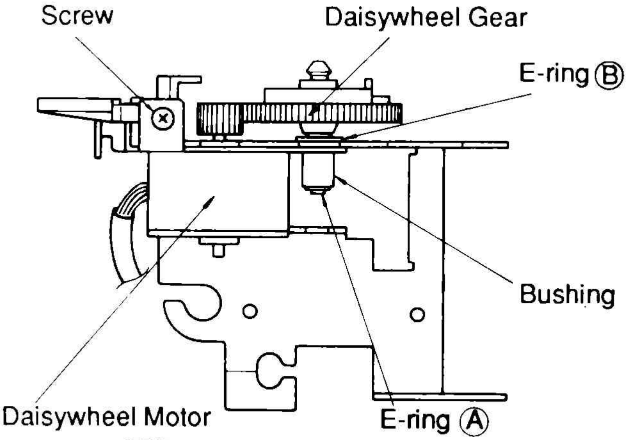
Replace in the reverse order.

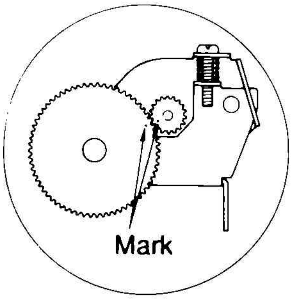


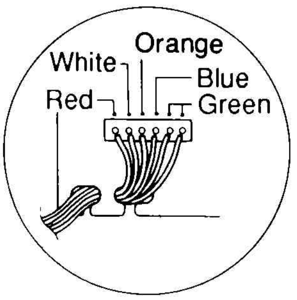
2.12 Hammer and Hammer Solenoid

1) Remove the E-rings from the Hammer Pivot Shaft.
2) Slide the Shaft to the left and remove the Hammer with the plastic washer and spring.
3) Remove the 2 screws from the Hammer Solenoid.
4) Remove the Solenoid.
5) Unsolder the Solenoid leads from the Carrier Board.

Replace in the reverse order.





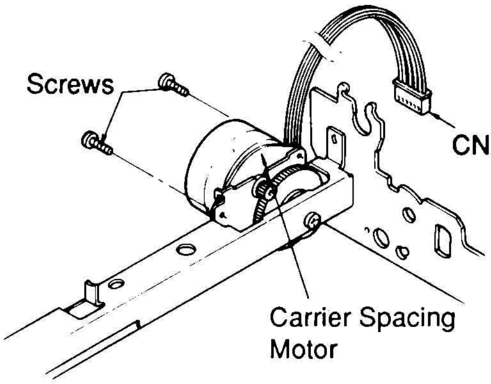


2.13 Daisywheel Motor

1) Remove the E-ring A from the Daisywheel Gear Shaft.
2) Pull the Daisywheel Gear forward to remove.
3) Remove the screw from the Daisywheel Motor.
4) Remove the E-ring B from the Daisywheel Shaft bushing.
5) Remove the Bushing.
6) Remove the Motor.
7) Unsolder the Motor leads from the Carrier Board.

Replace in the reverse order.

During replacement check the following:
- Make sure that leads match with indicated color as shown in the figure.
- Make sure that the marks on the two Daisywheel Drive Unit Gears are aligned.

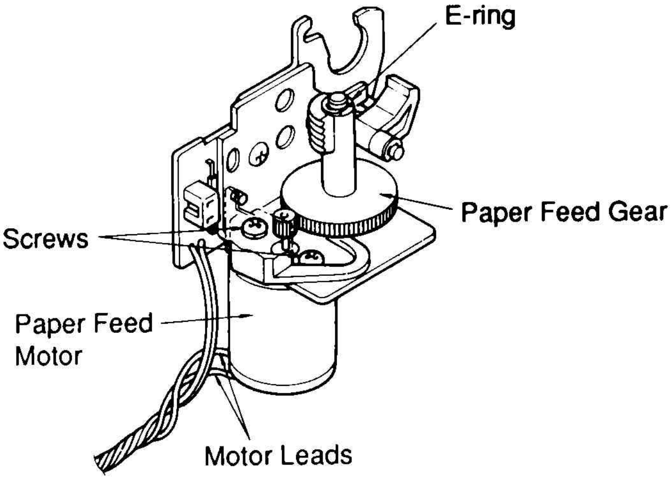


2.14 Carrier Spacing Motor

1) Remove the 2 screws and disengage the motor from the Cable Drum.

Replace in the reverse order.

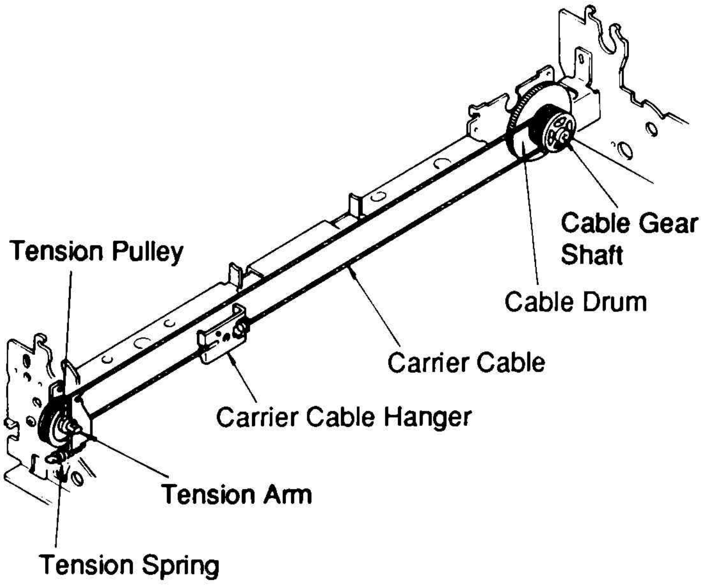
Note:
Connector CN2 must be unplugged before removing the motor as in section 2.4.



2.15 Paper Feed Motor

1) Remove the E-ring from the Paper Feed Gear Shaft.
2) Remove the Paper Feed Gear.
3) Remove the 2 screws and pull the Motor downward to remove it.
4) Unsolder the Motor leads.

Replace in the reverse order.



2.16 Carrier Cable

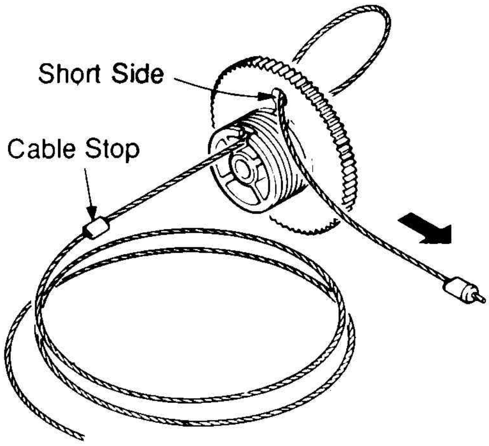
1) Remove the Tension spring from the Tension Arm.
2) Remove the Tension Arm from the frame.
3) Remove the Cable Gear Shaft screw and the Cable Drum.
4) Release the cable ends from the Carrier Cable Hanger.
5) Unwind the Carrier Cable.

Replace in the reverse order.

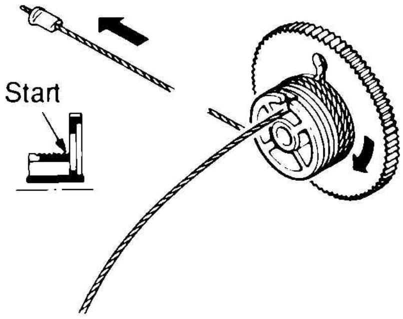
Follow the next step 2.17 for winding the cable on the Drum.

2.17 Carrier Cable Winding

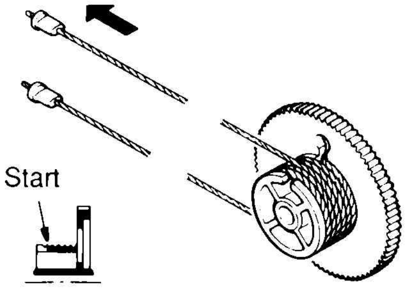
Note:
Use of Carrier Cable Jig No. PJZXXR250M will make cable installation much easier, as illustrated.



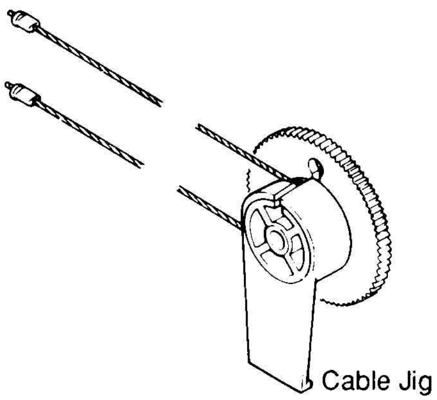
1) Insert the short end of the cable through the lower hole and back through the upper hole, pulling until the cable stops.



2) Wind the short cable end 3 full turns clockwise around the drum, starting in the first groove and hold while proceeding with Step "3".



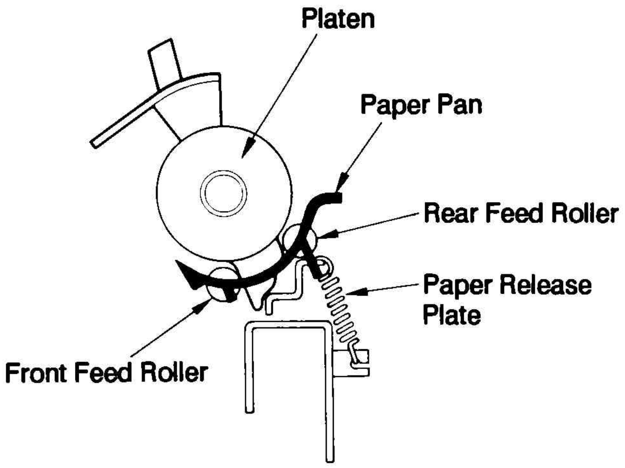
3) Wind the long cable end 4 full turns counterclockwise around the drum, starting in the first groove from the outside, and hold.



4) Slide the Carrier Cable Jig onto the drum, as illustrated, with the cable ends through the Jig opening.

Note:
- The cable can be held in place with tape if the Jig is not available.
- Pull the Carrier Cable Jig downward to remove.

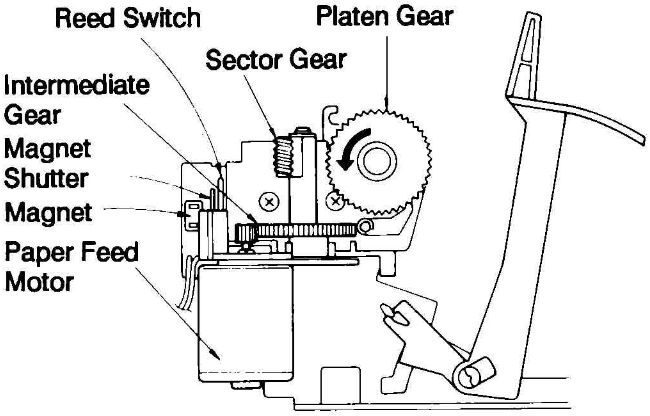
3. Mechanical Functions and Adjustments



(Right Side View)

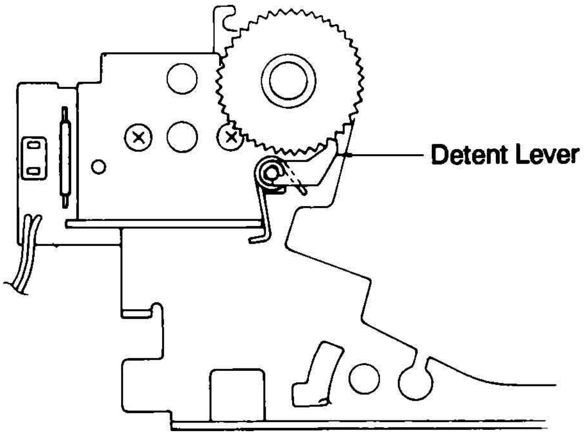
3.1 Paper Feed Mechanism

The paper feed mechanism, mounted on the Chassis, consists of the Platen, a spring-loaded Paper Release Plate and a floating Paper Pan which has 3 front and 3 rear Feed Rollers. As paper is inserted, it is guided between the rear Feed Rollers and the Platen, where it is gripped and fed as the Platen rotates. the paper can be advanced manually though use of either Platen Knob.



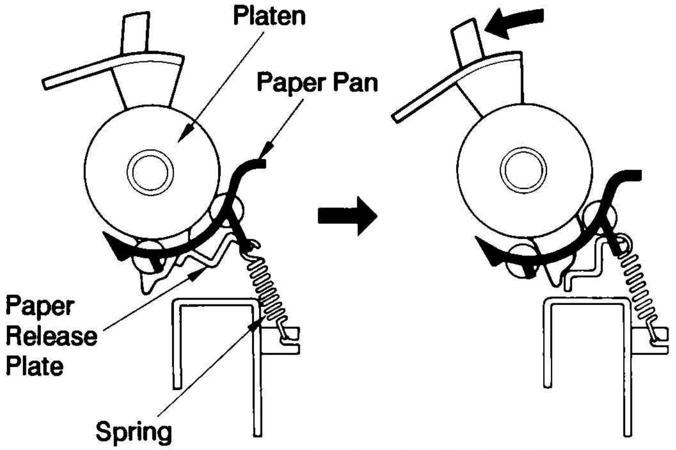
3.2 Paper Feed Motor

Drive for the Platen is provided by a DC motor, which rotates the Platen through a Sector Gear engaged with the Platen Gear. One complete revolution of the Intermediate Gear and Sector Gear provides 1/2 line space movement to the Platen. As the Motor is energized, it begins to rotate counterclockwise (viewed from the top) and its Gear causes the Intermediate Gear to rotate clockwise, bringing the Sector Gear into engagement with the Platen Gear and advancing the Platen. The Home Detecting Lever is activated by Cam rotation and Magnet Shutter mounted on the top of the Home Detecting Lever turns the Reed Switch off. The Motor and Gear continue to turn through momentum until a full revolution has been completed. After rotation is completed, Platen position is maintained by a spring-loaded Detent which is engaged with the Platen Ratchet. The Paper Feed Motor is actuated whenever the Carrier return key is depressed.



3.3 Line Space Detent

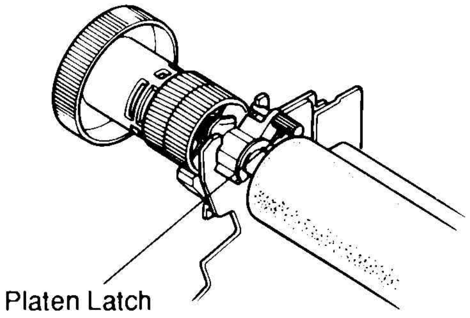
After each line space operation, the Detent Lever is fully seated between 2 platen gear teeth by the tension of the spring attached to the Detent shaft to obtain proper line space operation.



(Right Side View)

3.4 Paper Release Mechanism

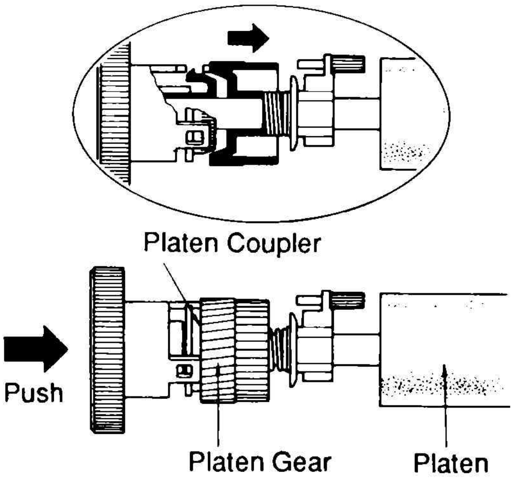
the Feed Roller and Paper Pan assembly is h against the Platen by the tension of 2 coil springs tached to a Paper release Plate.
Pulling the Paper Release Lever forward causes Paper Release Plate to move downward, increas the tension on the coil springs and allowing the Fe Rollers to move away from the Platen.



3.5 Platen Latches

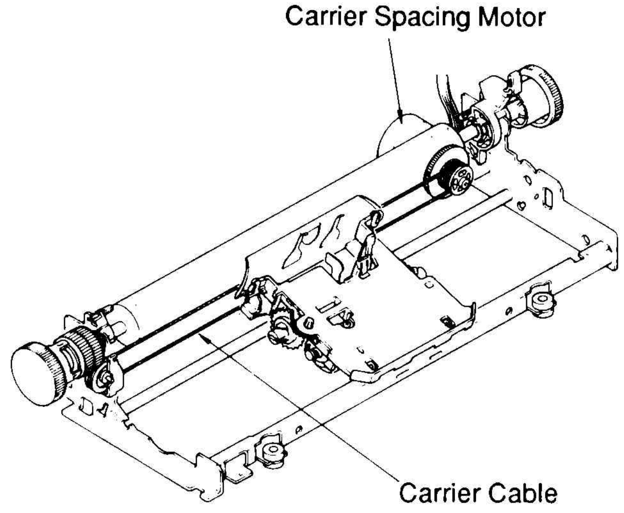
The Platen is held securely in place by molded pl tic rotary clamps installed on both ends of the plat The design of the Latches provides secure latch without the need of adjustment, and permits e Platen removal and replacement.

Note:
Hold the Paper Release Lever vertical when repl ing the Platen.



3.6 Platen Variable Clutch Mechanisr

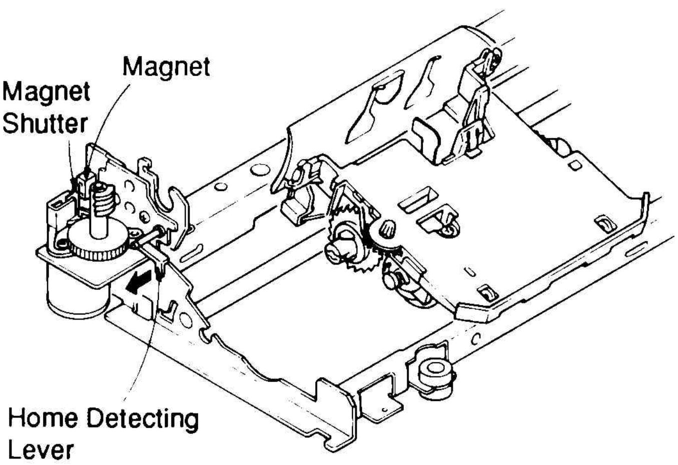
Normal rotational movement of the Platen Kr transmitted directly to the Platen, causes engaged Platen Gear to turn, limiting Platen mo ment to 1/2 space (1 tooth) increments. When left Platen Knob is pushed to the right, the spr loaded Platen Gear is moved to the right, diseng ing its clutch teeth from those inside the Pla Coupler, and allowing Platen rotation without turn the Platen Gear. This permits Platen movemen very small increments.



3.7 Carrier Spacing

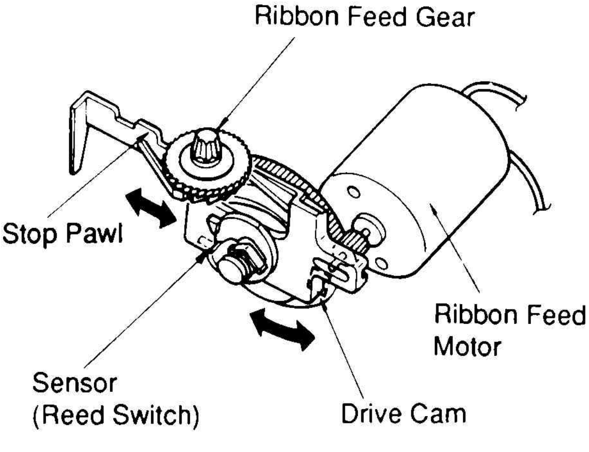
Carrier movement is provided by a stepping motor controlled by the Logic Board. Motor rotation is transmitted via a cable and pulley to the Carrier, changing the rotational motor movement to horizontal Carrier movement. The Carrier Motor is a stepping motor which operates in 7.5° increments for each pulse received. Each 7.5° step of the Motor provides carrier movement of 1/120" to the left or right, requiring the following number of steps, or pulses, per space, depending on pitch:

15 pitch = 1/15" = 8 steps
12 pitch = 1/12" = 10 steps
10 pitch = 1/10" = 12 steps



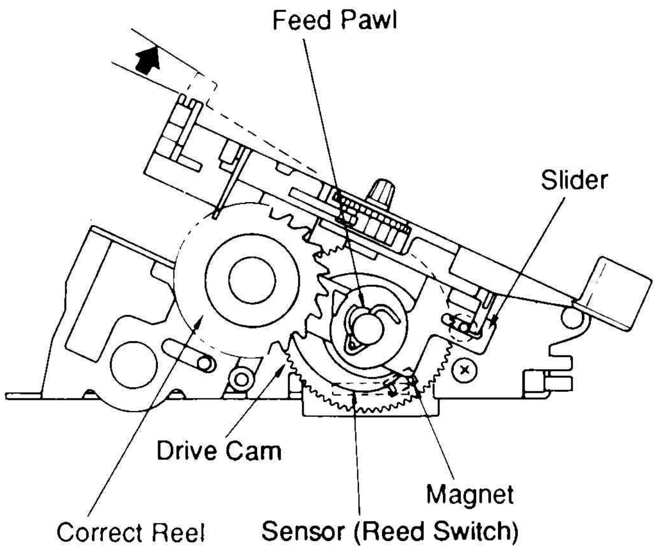
3.8 Carrier Home Sensor

The chassis is equipped with a limit Sensor to notify the CPU when the Carrier approaches its home position, the Home Detecting Lever is activated by the Card Holder and the Magnet Shutter mounted on the top of the Home Detecting Lever turns the Reed Switch off, generating the signal and indicating the carrier home position to the CPU.



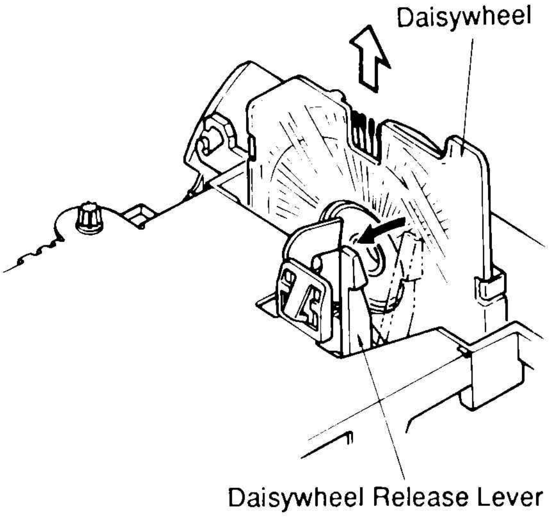
3.9 Ribbon Feed

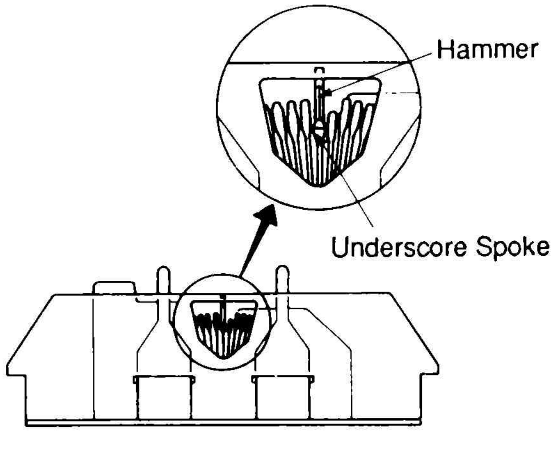
Ribbon Feed Drive is provided by a bi-directional DC motor, which also provides Correction Tape Lift and Feed, depending on which direction the motor is initially activated. the home, or starting position of the motor is determined by a magnetic sensor which senses the location of the magnet affixed to the inner surface of the Drive Cam. During a character printing operation, the Motor is energized and turns the Drive Cam in a counterclockwise direction (view from the left), until the magnet passes its sensor (Reed Switch). Thus one revolution of the Cam Feed Gear advances the Ribbon Feed Gear and the Ribbon. A Stop Pawl prevents reverse movement of the Feed Gear.



3.10 Correction Tape Feed

During a correction operation the Motor is energized, turning the Drive Cam in a clockwise direction approximately 180°, until the magnet passes its sensor (Reed Switch), at which time it reverses direction and returns to its home position. The Drive Cam's rotational movement is changed to vertical movement by a Cam Follower in the eccentric groove on the back of the Drive Cam, lifting the Ribbon Holder to its upper position. As the Motor lifts the Holder to its upper position, the tip of the Feed Pawl which pivots on the Slider engages the Feed Gear and continues upward movement causing the Feed Gear to be advanced by one tooth. The Stop Pawl (leaf spring) prevents reverse movement of the Correct Reel.

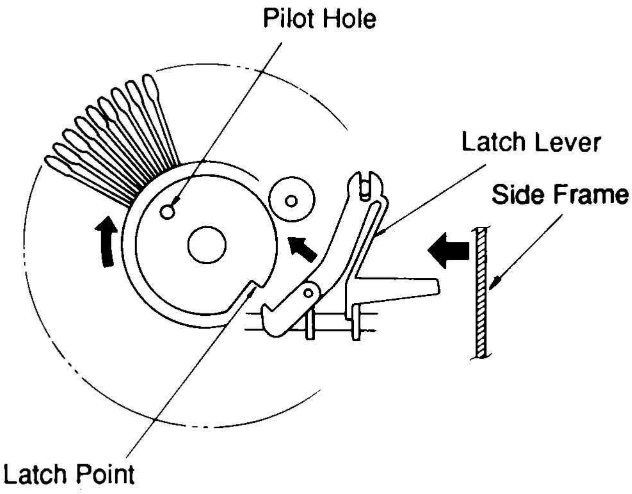




3.11 Daisywheel Motor and Character Printing

a) Daisywheel Motor
The Daisywheel Stepping Motor is mounted within the Carrier frame, and is controlled by the CPU. When a key is depressed, a signal is generated on the main Logic Board, energizing the Motor and causing it to rotate to the desired point, step by step. Each step of the motor provides for 3.75° or one character spoke movement of the Daisywheel. The home position of the Motor corresponds to the underscore character on the Daisywheel being positioned at the printing point. In this position. the impact Hammer must by aligned with the projection at the back of the underscore spoke. Pulling back on the Daisywheel Release Lever pushes down the Lock bar and moves the Motor away from the Platen. The Daisywheel Gear shaft and Pilot pin are disengaged from the Daisywheel, allowing the Daisywheel to the removed. Upon installation of the Daisywheel, pushing the lever forward firmly latches the Motor in the printing position. If the Pilot pin does not engage in the Pilot hole of the Daisywheel, it will re-engage automatically when the Carrier returns to the home position during initialization.

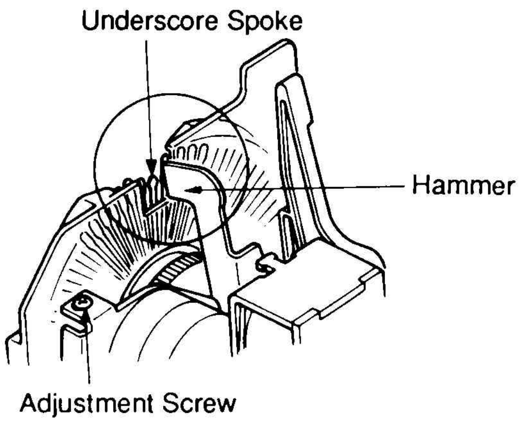
b) Character Printing
Once the Daisywheel has moved to the desired character, the Hammer Solenoid is energized by the CPU, causing the Hammer to move rapidly toward the Daisywheel, driving the character spoke into contact with the Platen. The strength of this impact is determined by the length of time the solenoid is energized, which is automatically controlled by the CPU corresponding to character surface area.

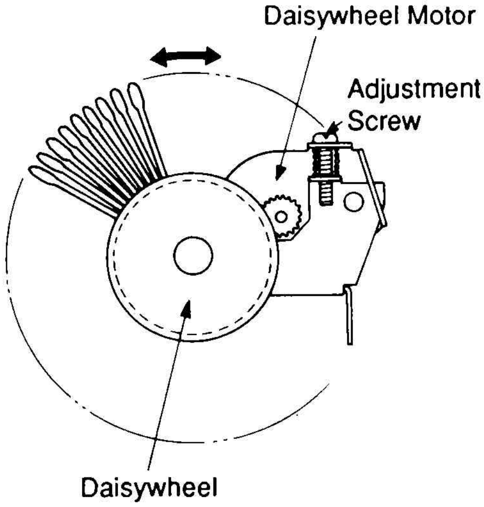


3.12 Initializing

Initialization is automatically performed when the power switch is turned on. When the power switch is turned on, the Carrier moves to the far left, then the Daisywheel Home Latch Lever is pushed inward by the left side frame and the Daisy Gear turns 2 revolutions. While the Daisywheel is turning, the Home Latch Lever catches the Daisywheel's latch point locating the Daisywheel home position and the Pilot Pin on the Daisy Gear engages in the Pilot hole in the Daisywheel. The Carrier then returns to the Carrier home position.

3.13 Daisy Home Position Adjustment





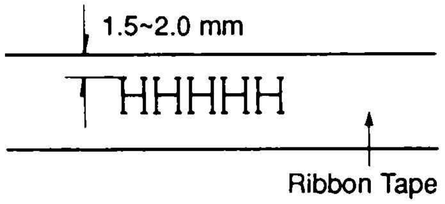
Each spoke must be directly aligned with the Hammer when its character key is depressed. If necessary or when installing a new motor, adjust as follows.

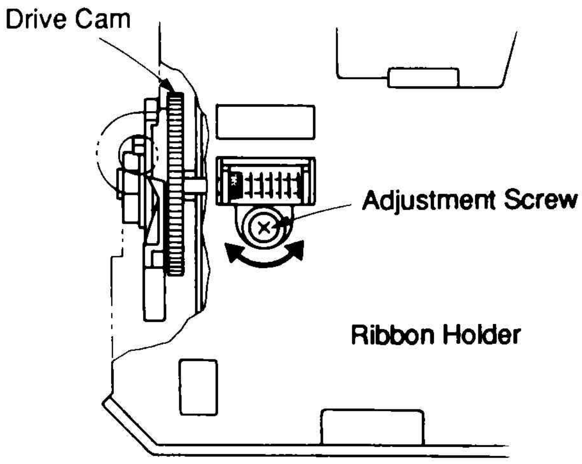
Important Note:

The Daisywheel Motor must only be adjusted in the "DAISY ADJ" mode with power supplied to the motor. In the "DAISY ADJ" mode the Daisywheel motor will be energized for 2 minutes, after that the display will read "PWR OFF/ON". This message will remain until the power is turned off.

1) Install a Daisywheel and latch the motor in printing position.
2) Initialize the Daisywheel as in section 3.12.
3) Press the SHIFT + REPEAT keys and turn on the power at the same time. Display will read "DAISY ADJ".
4) Manually push the Hammer toward the Daisywheel, and observe the underscore spoke locator in relation to the Hammer groove. If the Hammer is not aligned with the underscore spoke, follow the next step.
5) Align the Hammer groove with underscore spoke locator by turning the Adjustment screw. After adjusting the position, observe the alignment by repeating steps 2) 3) 4).
6) Apply a locking compound to the Adjustment screw to prevent loosening.

3.14 Ribbon Lift Adjustment





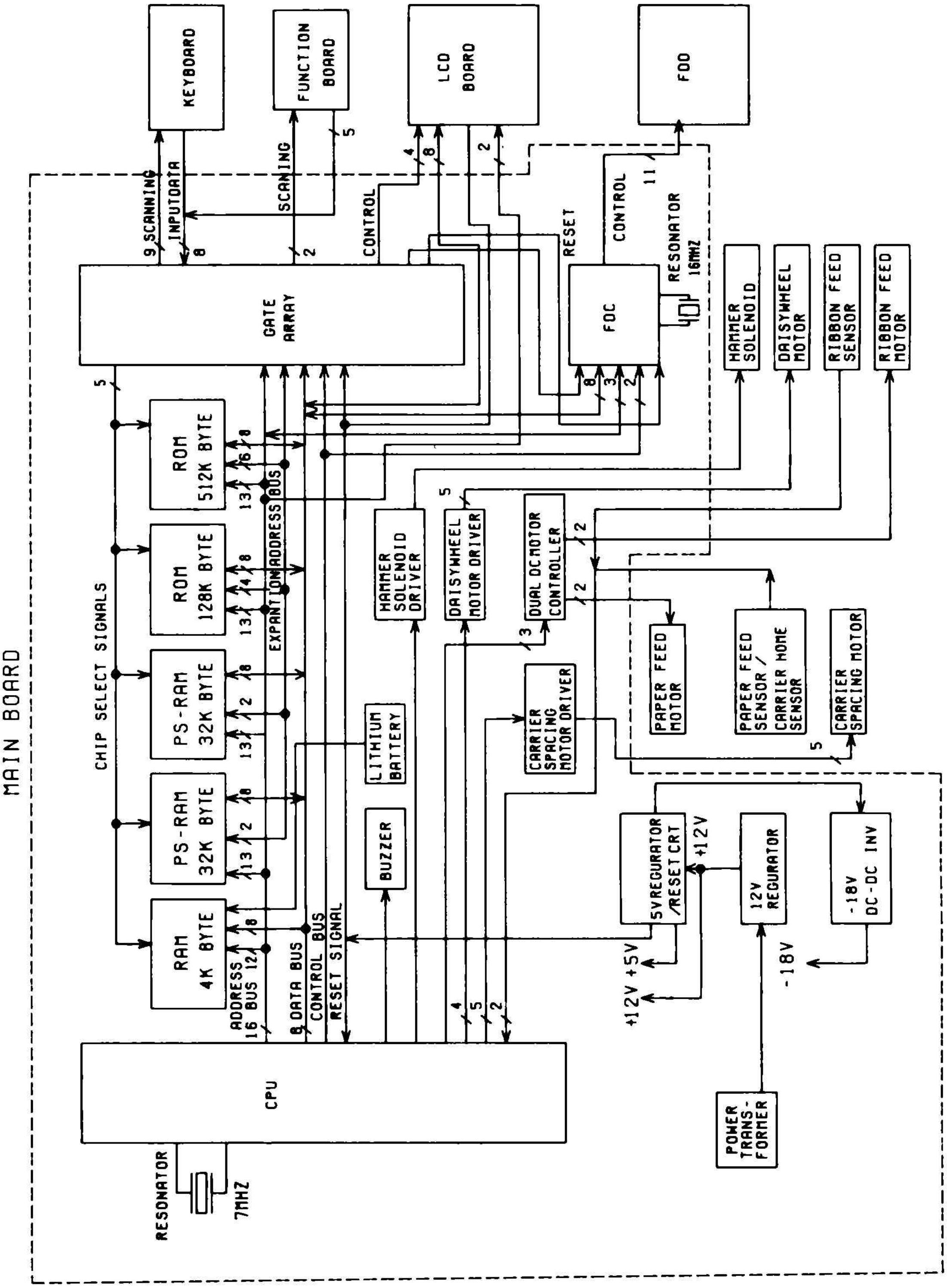
(Top View)

The typed character must strike near the upper edge of the Ribbon (See the illustration). Check by typing several characters and observing their position on the Ribbon.

1) The tops of capital letters should be 1.5 to 2.0 mm from the upper edge of the Ribbon.
2) If the character is not in the proper position, adjust the position by turning the adjustment screw. Turning the screw clockwise will raise the position of the characters on the ribbon and counterclockwise will lower the position.

4. Electronic Circuit Descriptions

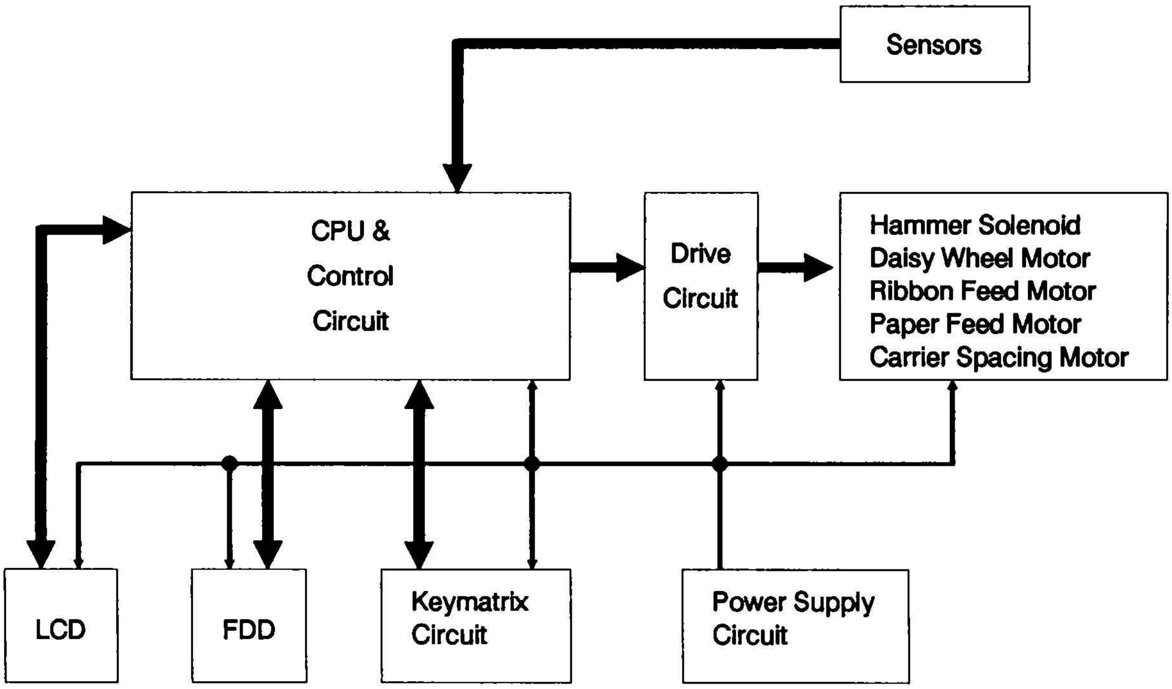
Block Diagram



4.1 Principle of Operation

This chapter explains the basic operation of the electronic circuitry for this personal word processor.

This personal word processor is mainly composed of control, drive, power supply circuits, motors, print hammer, keyboard, LCD display, FDD and sensors.
The control circuit is composed of ROM, RAM, Gate Array and CPU which controls every operation of this word processor. The control circuit inputs the key data from the key matrix circuit which consists of 72 keys keyboard and 10 push switches of the control panel. Then controls the 480 × 128 dots LCD, drive the floppy disk drive through the floppy disk controller, and drives the print hammer, the daisy wheel motor, the ribbon feed motor, the paper feed motor and the carrier spacing motor through the drive circuit with sensing two magnetic sensors which are the ribbon feed sensor and the carrier home/paper feed sensor.

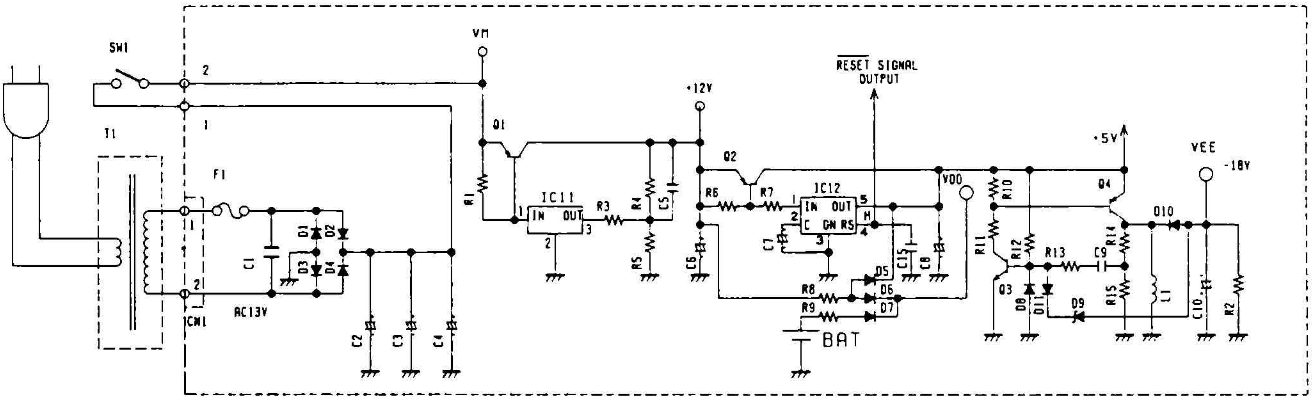


4.2 Power Supply

4.2.1 General Description

The 120 volt AC input is stepped down by transformer T1, rectified by diodes D1-D4 then filtered by C2, C3 and C4. The filtered DC passes through the power switch SW1 and into the +12 volt, +5 volt regulator circuits and –18 V generator circuits.

+VM -----Carrier Spacing Motor
+12 V ----Daisywheel Motor, DC Motors, Print Hammer, Buzzer
+5 V -----Logic Circuit, Floppy Disk Drive
–18 V -----LCD

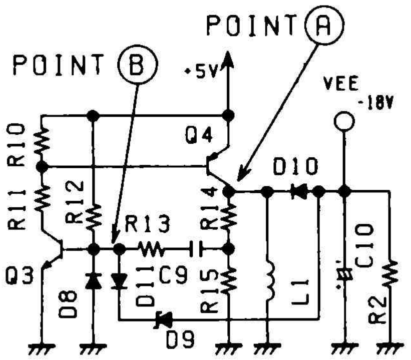


Voltage Condition: At standby condition
Note: VM = 19 V at standby condition
VM = 13-16 V at printing condition

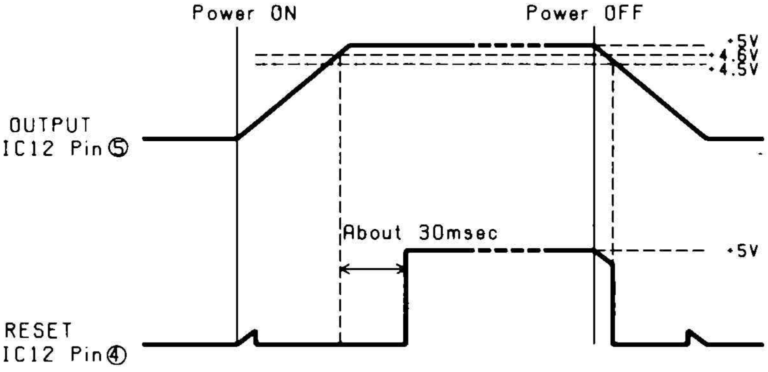
a) +12 V Power Supply
The +12 V power supply uses a transistor (Q1) and a voltage regulator (IC11).
The collector of transistor (Q1) remains at +12 V by R3, R4, R5 and IC11.

b) +5 V Power Supply and Reset Circuit

The +5 V power supply contains a transistor (Q2) and a voltage regulator (IC12). The voltage regulator composed with the +5 V regulator which determine the collector voltage of the transistor Q2 and the reset circuit which is provided to initialize the CPU (IC1) and the Gate Array (IC2). The reset time is controlled by C7, which is connected to pin 2 of IC12. When the power switch (SW1) is turned on, the voltage at point Ⓐ rises. After the voltage at point Ⓐ rises over about +4.6 V, the reset signal, which is L level, is provided for 30 msec.

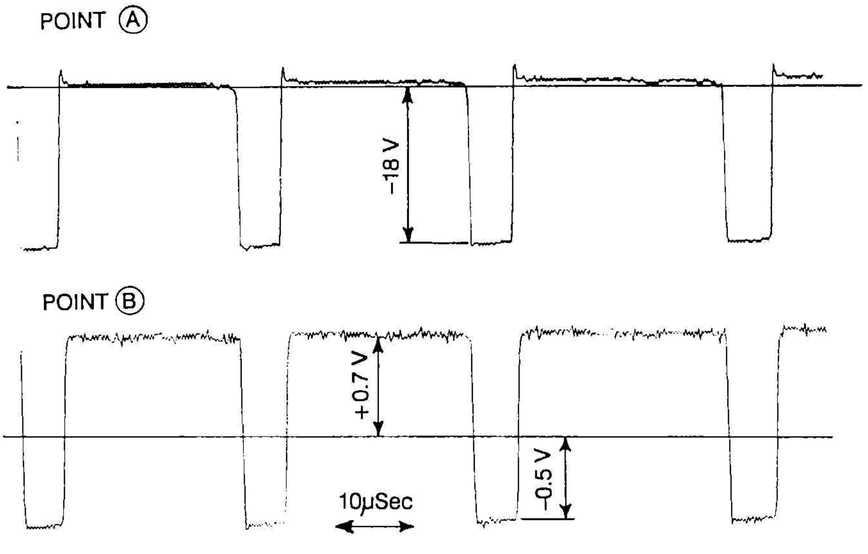


Timing Chart



c) −18 V Power Supply

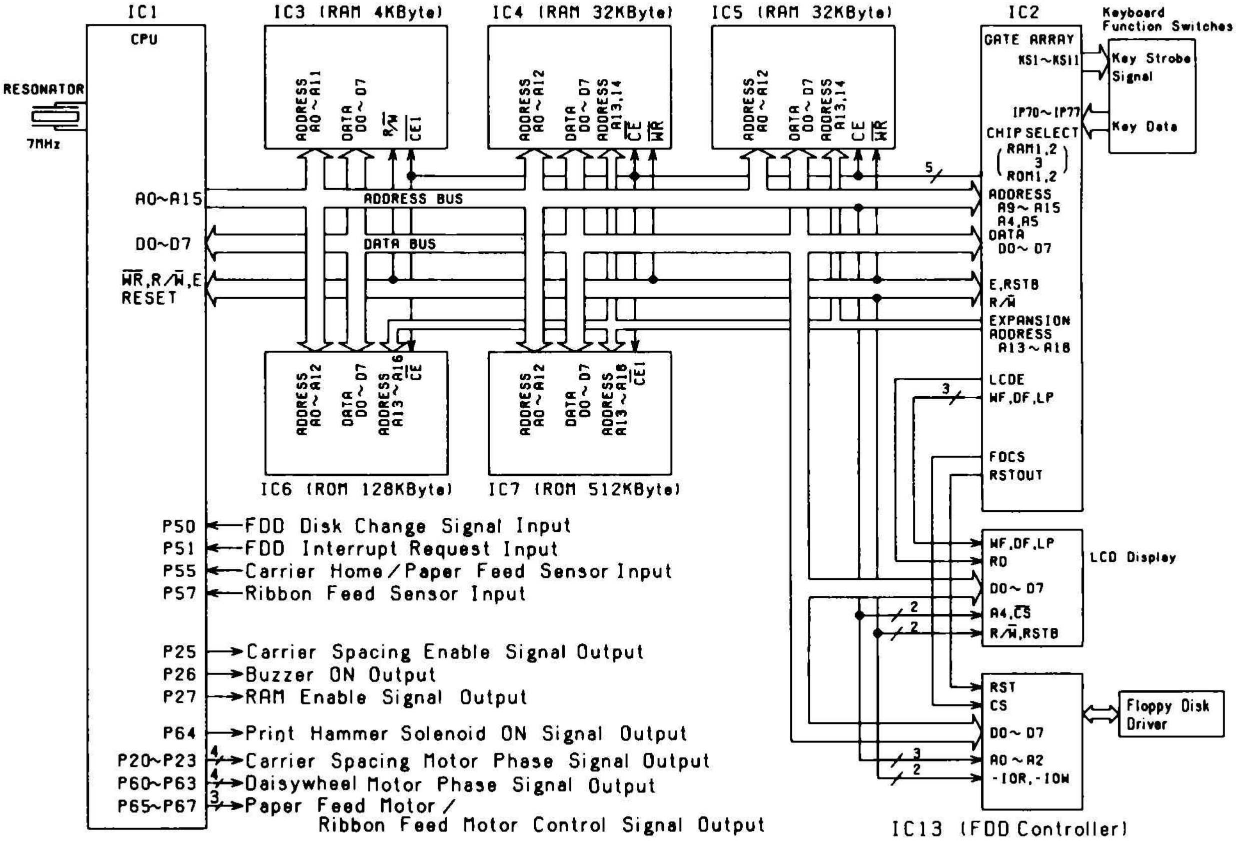
The −18 V power supply is used for LCD display drive and is generated by +5 V. This circuit is a oscillator circuit and mainly consists of Q3, Q4, L1, C9 and D9. Then when the transistor Q4 is turned on, the electrical energy is stored into inductance L1, and when the transistor Q4 is turned off, the stored energy of the L1 generate negative voltage. The output voltage is determined about −18 V by the zener diode D9.



4.3 CPU and Control Circuit

4.3.1 General Description

This block mainly consists of the CPU (IC1), ROM (IC6, 7), RAM (IC3, 4, 5), and the Gate Array (IC2). The CPU receives key data from the keyboard through the Gate Array (IC2), processes the input from various sensors and function switches and controls the daisywheel, paper feed, carrier spacing, ribbon feed motors and the hammer solenoid.



4.3.2 CPU

This typewriter is a microprocessor controlled. It is controlled by a HD63B03x CPU "Central Processing Unit" IC1. The CPU has full control over all machine functions. It controls the printer mechanism, keyboard scanning, the display and memory management. The pin names and functions are shown in the following chart.

NAME	FUNCTION					NAME	FUNCTION
Vss	GND		1	64	→	E	System Clock (1.5 MHz)
XTAL	RESONATOR Input (7 MHz)	→	2	63	→	RD	READ Signal
EXTAL		→	3	62	→	WR	WRITE Signal
MP0	CPU Mode Select (+5 V)	→	4	61	→	$R/\overline{W}$	$R/\overline{W}$ Signal
MP1	CPU Mode Select (0 V)	→	5	60	→	LIR	NC
RES	Reset	→	6	59	→	BA	NC
STBY	Not used (+5 V)	→	7	58	↔	D0	Data Bus
NM1	Not used (+5 V)	→	8	57	↔	D1	
P20	Carrier Spacing Motor Phase Signal	←	9	56	↔	D2	
P21		←	10	55	↔	D3	
P22		←	11	54	↔	D4	
P23		←	12	53	↔	D5	
P24	NC	←	13	52	↔	D6	
P25	Carrier Spacing Enable	←	14	51	↔	D7	
P26	BUZZER	←	15	50	→	A0	Address Bus
P27	RAM Enable Signal	←	16	49	→	A1	
P50	FDD Disk Change Signal	→	17	48	→	A2	
P51	FDD Interrupt Request	→	18	47	→	A3	
P52	Not used (+5 V)	→	19	46	→	A4	
P53	Not used (+5 V)	→	20	45	→	A5	
P54	Not used (+5 V)	→	21	44	→	A6	
P55	Carrier Home / Paper Feed Sensor	→	22	43	→	A7	
P56	Not used (+5 V)	→	23	42	→	Vss	GND
P57	Ribbon Feed Sensor	→	24	41	→	A8	Address Bus
P60	Daisywheel Motor Phase Signal	←	25	40	→	A9	
P61		←	26	39	→	A10	
P62		←	27	38	→	A11	
P63		←	28	37	→	A12	
P64	Print Hammer Solenoid ON Signal	←	29	36	→	A13	
P65	Paper Feed Motor/Ribbon Feed Motor Control Signal	←	30	35	→	A14	
P66		←	31	34	→	A15	
P67		←	32	33		Vcc	+5V

4.3.3 Memory Map and Expansion Memory

The CPU (IC1) can manage a 64K byte memory area but this typewriter needs a 576K byte memory area to operate. The memory area consists of the following: a 128K byte operating program area, 64K byte RAM area, 384K byte dictionary area, and an I/O area.

The 64K byte management capability of the CPU is expanded by using two 16K byte windows. The expansion memory area consists of two 32K byte TEXT RAM area and a 384K byte dictionary area which is divided into thirty one 16K byte blocks, each having its own address code. When the CPU writes one of these address codes into a BANK register, the CPU can access that memory block through the BANK window by means of the expansion memory decode circuit. For example, when the CPU writes "40" (data) into the BANK 1 register, the CPU can access block 1 in IC6 (128K byte ROM) through the BANK 1 window.

The CPU's remaining 32K byte memory area is divided and assigned for 192 byte internal RAM, 4K byte RAM (IC3) area, interface area, and 16K byte operating program area.

The 16K operating program assignment: If the VECT terminal (IC2 Pin 5) is connected to 0 V, the operating program is located in the external ROM (IC6). If the VECT terminal (IC2 Pin 5) is connected to +5 V, the operating program is located in the bottom of the 512K byte ROM (IC7).

Memory Map (64K byte)

ADDRESS	Used For
0000 001F	Internal Register CPU (IC1)
0020 003F	Not used
0040 00FF	Internal 192 byte RAM CPU (IC1)
0100 03FF	Not used
0400	Gate Array (IC2) Key Scan Register
0410	Gate Array (IC2) Key Matrix Date Input
0420	Not used
0430	Gate Array (IC2) LCDC Control Register
0600 06FF	Gate Array (IC2) BANK0 Selection Register
0620 063F	Gate Array (IC2) BANK1 Selection Register
0A00 0BFF	LCD Display
0C00 0FFF	FDD Controller
1000 1FFF	Not used
2000 2FFF	4K byte RAM (IC3)
3000 3FFF	4K byte window (IC4/5)
4000 7FFF	BANK0 (16K byte) Window
8000 BFFF	BANK1 (16K byte) Window
C000 FFFF	*16K byte ROM (IC6/IC7) Operating Program Area (Common)

*Note Program Common Area is located in IC6 (128K byte ROM) or bottom 16K byte in IC7 (512K byte ROM). The selection is determined by the status of the VECT pin on the Gate Array IC2 Pin 5.

Expansion Memory Map (512K byte)

IC4 32K byte RAM

BLOCK	CODE	NAME
0	10	TEXT Memory Area
1	14	

IC5 32K byte RAM

BLOCK	CODE	NAME
2	20	TEXT Memory Area
3	24	

IC7

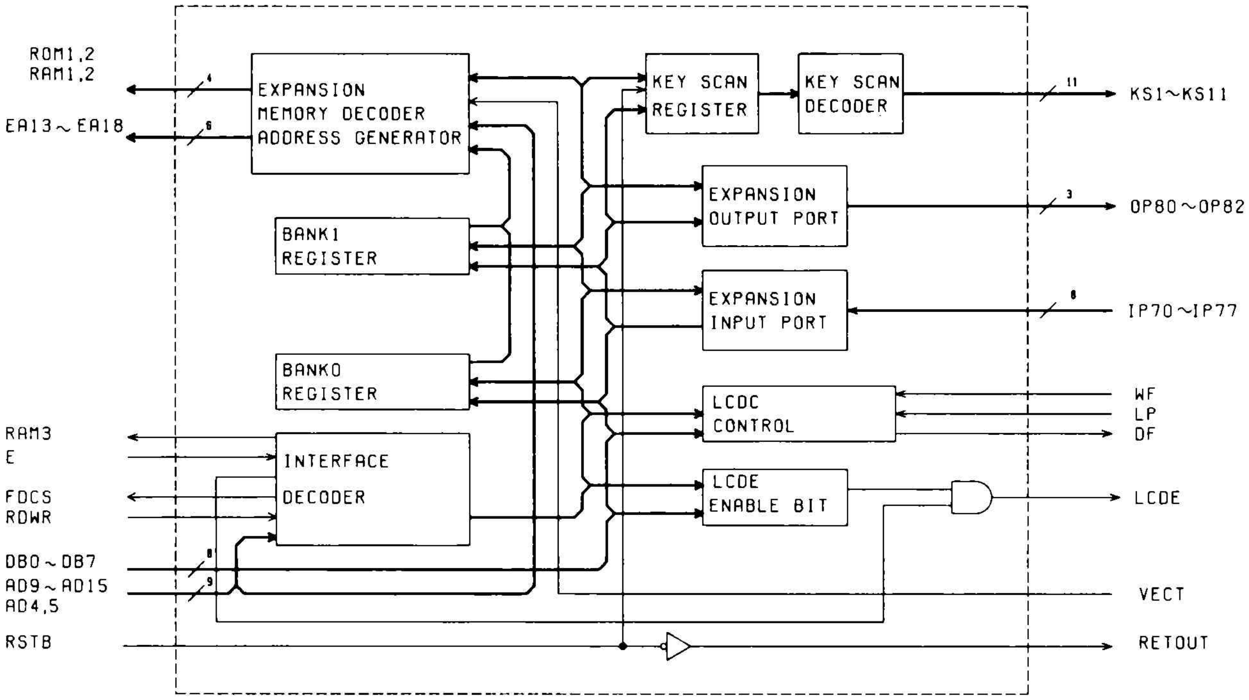
BLOCK	CODE	NAME
4	80	Dictionary Area 16K byte
5	84	Dictionary Area 16K byte
⋮		⋮
18	B8	Dictionary Area 16K byte
19	BC	Dictionary Area 16K byte
20	C0	Operating Program Area 16K byte
21	C4	Operating Program Area 16K byte
⋮		⋮
33	F4	Operating Program Area 16K byte
34	F8	Operating Program Area 16K byte

ROM	Installed	Not Installed
Common Program	IC6	IC7 Bottom 16K byte
VECT (IC2) Pin 5	0 V	+5 V

4.3.4 Gate Array

The Gate Array (IC2) is an original LSI which integrates complex circuits into 1 chip IC. Basically the Gate Array consists of 10 circuits. The key scan register, the key scan decoder and the expansion input port are used to sense the key data and push switch positions. The expansion memory decoder, BANK 0 register and BANK 1 register are used to access expansion memory area (IC4, 5, 7). The expansion output port is a 3 bit output port (not used). The interface decoder is used to access other block circuits in the Gate Array, and access the LCD and 4K byte RAM (IC3).

Gate Array (IC2) Block Diagram



4.3.5 Memory Select

The Gate Array (IC2) has 5 memory select signal outputs for ROM1, 2 and RAM1, 2, 3. The memory select output signal is generated by the expansion memory decoder and the address generator which decode the address signals. When the CPU selects a memory chip, a low (L) active pulse signal is generated by the decoder then read or write is accomplished.

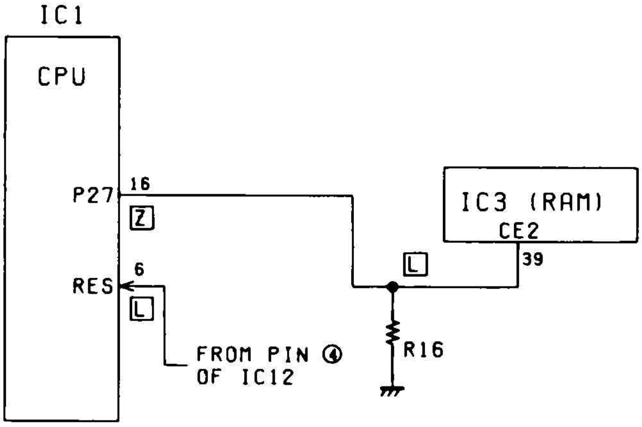
4.3.6 Gate Array Pin Function

The Gate Array pin functions are shown in the following chart.

NAME	FUNCTION					NAME	FUNCTION
WF	LCD Control Signal	→	1	64		VDD	+5 V
DF		←	2	63	→	OP82	Not used
LP		→	3	62	→	OP80	
OP81	Not used	←	4	61	←	RSTB	RESET
VECT	VECTOR	→	5	60	→	LCDE	LCD Enable
KS11	Key Scan Output with Open Drain	→	6	59	←	E	E Clock
KS10		→	7	58	←	RDWR	READ/WRITE
IP77	Key Data Input	→	8	57	←	A15	Address Bus
IP76		→	9	56	←	A14	
IP75		→	10	55	←	A13	
IP74		→	11	54	→	EA18	Expansion Address Bus
IP73		→	12	53	→	EA16	
IP72		→	13	52	→	EA17	
IP71		→	14	51	→	EA15	
IP70		→	15	50	→	EA14	
GND	Ground (0 V)		16	49	←	A12	Address Bus
KS9	Key Scan Output with Open Drain	←	17	48		GND	Ground (0 V)
KS8		←	18	47	→	EA13	Expansion Address Bus
KS7		←	19	46	←	A9	Address Bus
KS6		←	20	45	←	A5	
KS5		←	21	44	←	A11	
KS4		←	22	43	←	A4	
KS3		←	23	42	←	A10	
KS2		←	24	41	→	ROM1	IC7 Chip Select
KS1		←	25	40	↔	D7	Data Bus
ROM2	IC6 Chip Select	←	26	39	↔	D6	
RAM1	IC5 Chip Select	←	27	38	↔	D0	
RAM2	IC4 Chip Select	←	28	37	↔	D5	
RAM3	IC3 Chip Select	←	29	36	↔	D1	
$\overline{\text{FDCS}}$	FDC (IC) Chip Select	←	30	35	↔	D4	
RSTOUT	RESET OUT for FDC	←	31	34	↔	D2	
VDD	+5 V	←	32	33	↔	D3	

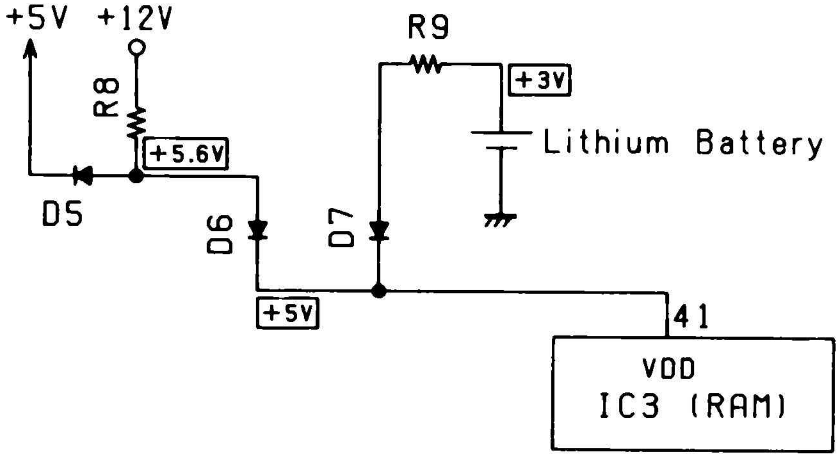
4.3.7 Memory Protection Circuit

The circuit prevents writing data to the RAM chips when the Unit is turned on or off and while the memory retention is in the backup mode. When the reset signal (L level) is provided to IC1 (CPU), pin 16 (P27) of IC1 is turned to high impedance from H level. Thus the RAM CE2 terminal becomes L level by R16, and the RAM data can not be accessed by the CPU thus protecting the memory.
When the reset signal becomes H level from L level, the pin 16 of the CPU I/O port is turned to H level by the software, and the RAM data can be accessed by the CPU.



4.3.8 Memory Backup Circuit

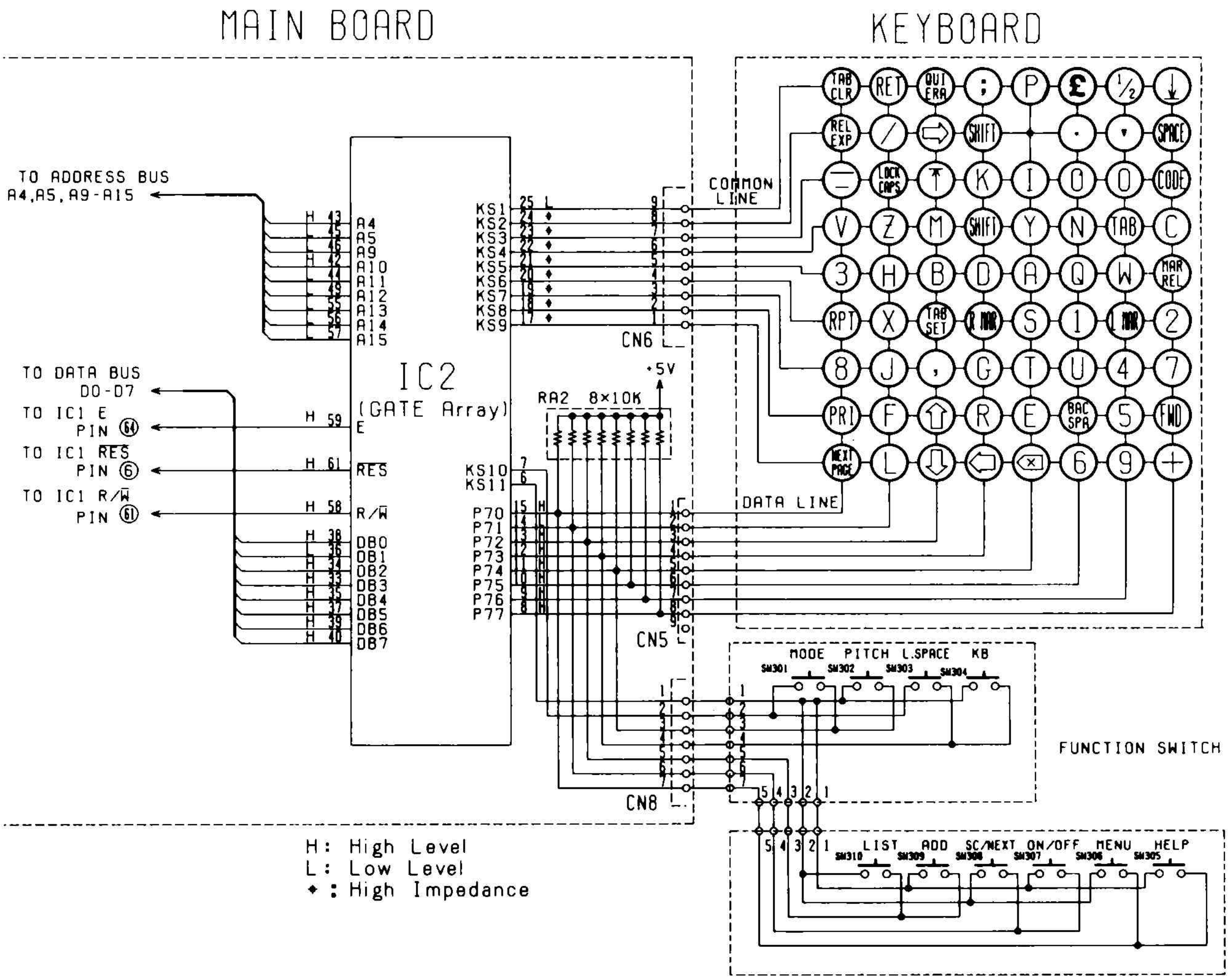
The circuit contains the lithium battery used to back up the phrase memory, the user dictionary and the margin format. In normal condition, the power is supplied to the RAM from the +12 V power source to maintain the memory. When the voltage at the cathode of D6 becomes lower than +3 V, because of either the power switch or accidental power interruption, the lithium battery starts supplying about +3 V 1 μA to the RAM VDD terminals (IC3) through R9 and D7 to maintain the memory.

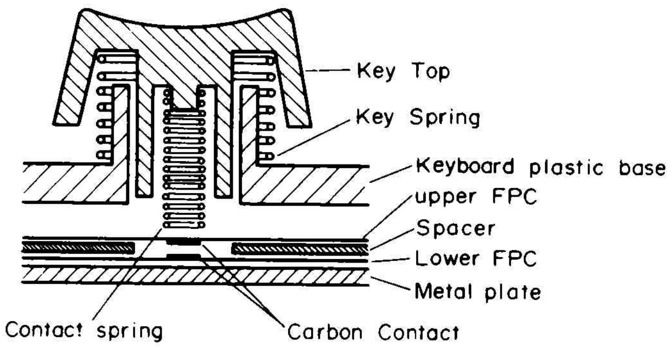


Voltage Condition: At standby condition

4.4 Keyboard Matrix Circuit

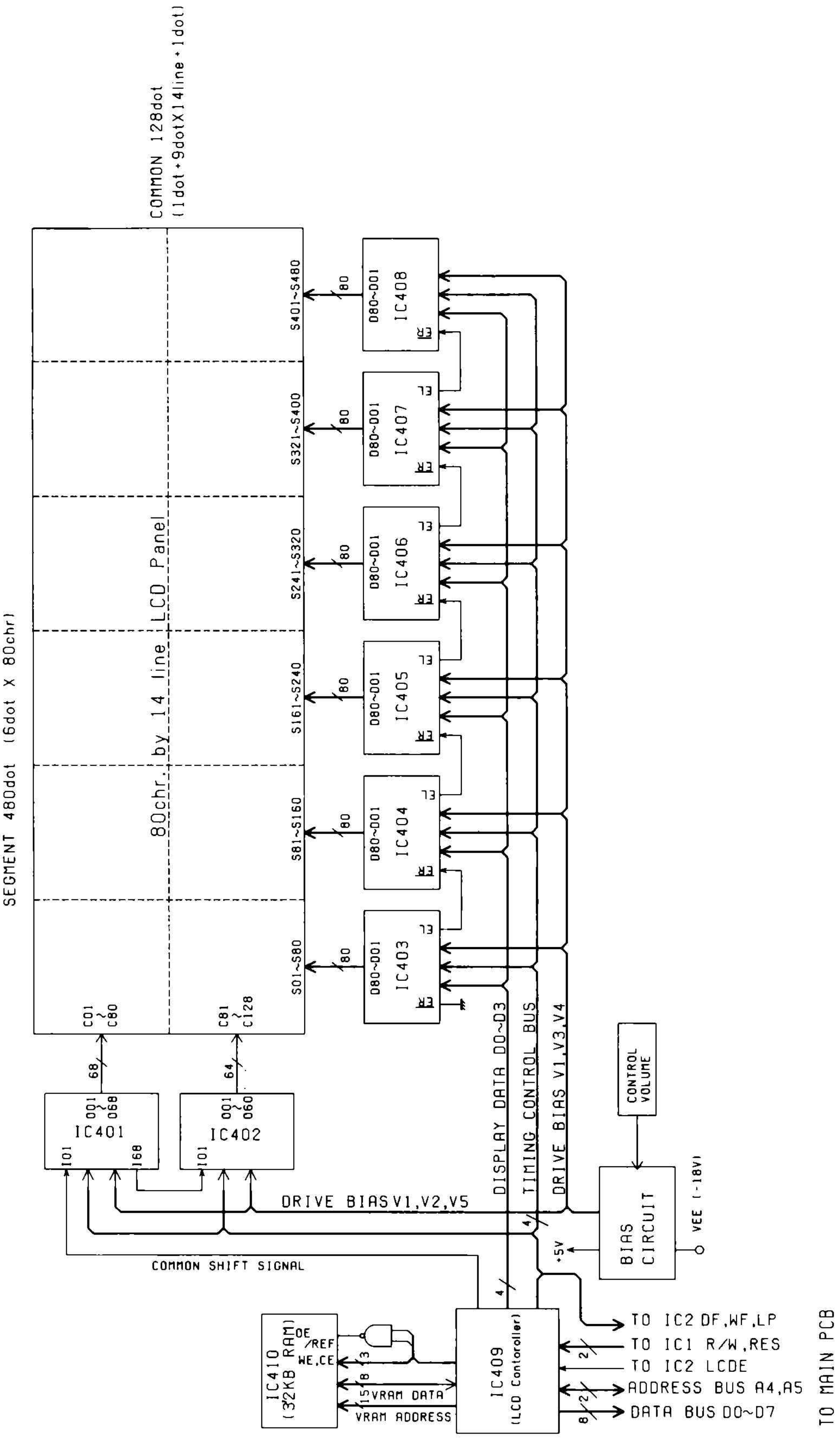
The matrix circuit is composed of a key scan register, a key scan decoder and an 8 bit expansion input port which are located in the Gate Array (IC2), the keyboard and the function switch board. KS1-KS9 are connected to the keyboard switches and KS10-KS11 are connected to the function switches which are composed of 10 push switches. When one of the scanning output (KS1-KS11) lines in the scanning decoder is turned from high impedance to Low level, the data of the key which is connected to the selected scanning line, is sent to the CPU through the expansion input port and data bus (D0-D7). The scanning output line (KS1-KS11) which is turned to Low level is determined by data written into the key scan register by the CPU. The CPU then reads the 8 bit key data from IP70-IP77 (address 0410). The CPU can sense all data about every 20 msec. For example, when the CPU reads address 0410 after writing data "01" to the key scan register and the RETURN key is pushed, the voltages are as shown in the following Schematic.





4.5 Liquid Crystal Display

Block Diagram

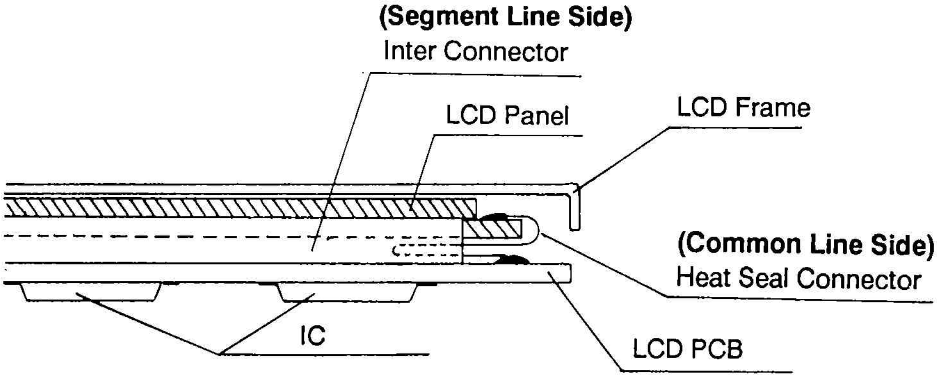


4.5.1 LCD General Construction

This LCD module is composed of a LCD Panel, two inter connectors, a LCD frame, a heat seal, LCD PCB , and several ICs (2 common drivers, 6 segment drivers, a LCD controller, a pseudo static RAM, a OP amp, and a NAND Gate).
LCD Panel has 480 x 128 dots which consists of matrix of 480 segment lines and 128 common lines as a display area. The 480 segment lines are divided into 240 segment lines and are connected to the LCD PCB through the inter connector which is made from silicon rubber and carbon on the both side of the LCD panel. The 128 common lines are connected to the LCD PCB through the heat seal which is a carbon printed film.
The LCD frame is used to fix the LCD panel to the LCD PCB at the best position so that each segment line is connected printed pattern on the LCD PCB correctly.

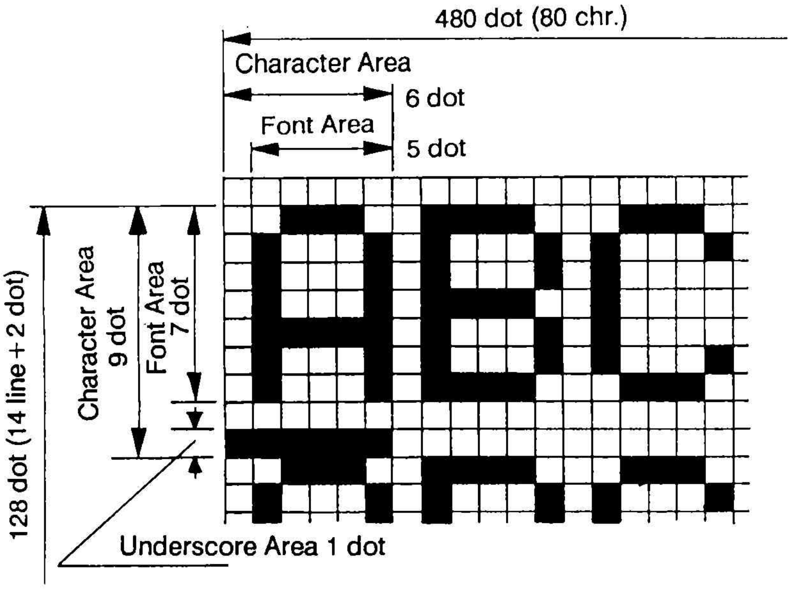
CAUTION:
Don't disassemble the LCD frame from the LCD PCB. LCD frame is fixed between LCD panel and LCD PCB by the critical adjustment.

Structure of LCD



4.5.2 Character Arrangement and Construction

A character area is composed of 6 x 9 dots.
Each character has font area which is composed of a matrix of 5 x 7 dots, underscore area 6 x 1 dots which is located bottom of the character area, two blank areas, one is located first line of the character area, and another one is located between font area and underscore area.



4.5.3 Bias Circuit

LCD needs 6 levels voltage bias (V1-V5) to display.
V1 is fixed to +5 V. V6 is determined by the base bias of Q401 which is created by R412 and VR401, and customer can control the V6 bias by adjusting the volume VR401. Then V2-V4 are generated by the bias which is divided by R401-R405 between V1 and V6, and output through OP amp IC411. When the resistance between collector and base of Q401 is increased, the voltage between V1 and V6 is increased and the display of the LCD becomes bright.
When the resistance between collector and base of Q401 is at maximum, each voltage is as follows.
V1: +5 V, V2: +3.1 V, V3: +1.3 V, V4: –14.0 V, V5: –15.9 V, V6: –17.7 V

4.5.4 LCD Display Control Circuit

LCD control circuit is consists of LCD controller SED1330 (IC409), 32K byte pseudo static RAM (IC410) and OP Amp (IC411).
This circuit is operated as follows.

1. After power switch is turned on (at the initialize routine) CPU initialize the LCD controller and the RAM (IC410). Then the CPU writes every character's font data into the CG RAM area of the RAM (IC410) through the LCD controller(IC409).

2. CPU writes the character code date into the VRAM area of the RAM (IC410) through the LCD controller (IC409).

3. LCD controller picks up the character code from VRAM area and display each character on the LCD.

4.5.5 Segment and Common Driver Circuit

Segment and common driver circuit is consisted of 2 common drivers IC401,IC402 and 6 segment drivers IC403-IC408. Each common driver can drive 80 common lines, and each segment driver can drive 80 segment lines. This LCD module is enough to drive only 126 common lines, so one common driver IC401 drives 68 common lines and another one IC402 drives 64 common lines. Each common driver and segment driver is assigned as a diagram.
The LCD controller scans display data, continuously. The scanning method as a follows.

1. LCD controller sends segment data of the first common line to the segment driver IC403-IC408 through XD0-XD3 of the LCD controller IC409.

2. LCD driver IC403-IC408 output the segment datas of the first common line. At the same time LCD controller turn on the first common line of the common driver.

3. LCD controller scans from the 1st common line data to the 128th common line data continuously.

Scanning timing pulses (XSCL, WF, LP, YSCL, YD, YDIS) are sent from the LCD controller IC409 and controls LCD drivers (IC401-408), then to make the display of the LCD clean WF, LP signal timings are modified by the NAND GATE (IC412) and the Gate Array (IC2) of the main PCB.

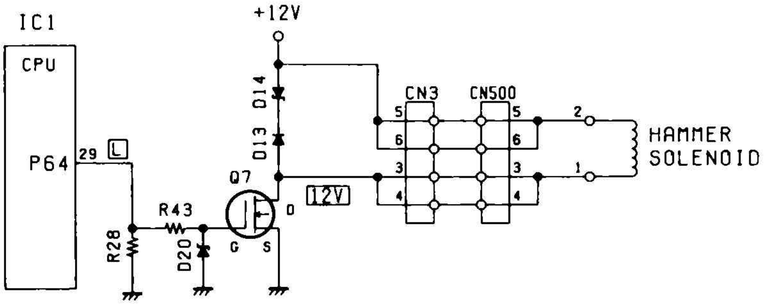
4.6 Drive Circuit

4.6.1 Print Hammer Drive Circuit

When energized the plunger of the hammer solenoid strikes the print hammer, which in turn impacts a spoke on the daisywheel and prints a character. The amount of impact force is controlled by the software.
Each character on the daisywheel has a different surface area, requiring a different impact for proper print. For example, a capital "W" has a large surface area, requiring a heavier impact to print correctly. A period ".", however, requires much less impact to obtain the same impression. When a "W" is typed it is given a longer impact time than a ".". In this way each character has its own defined impact duration, providing an even impression level.
This typewriter has three impression levels. "IMPRESSION:1" is softer than "IMPRESSION:3". The impression level that is set, is retained after the typewriter is turned off.

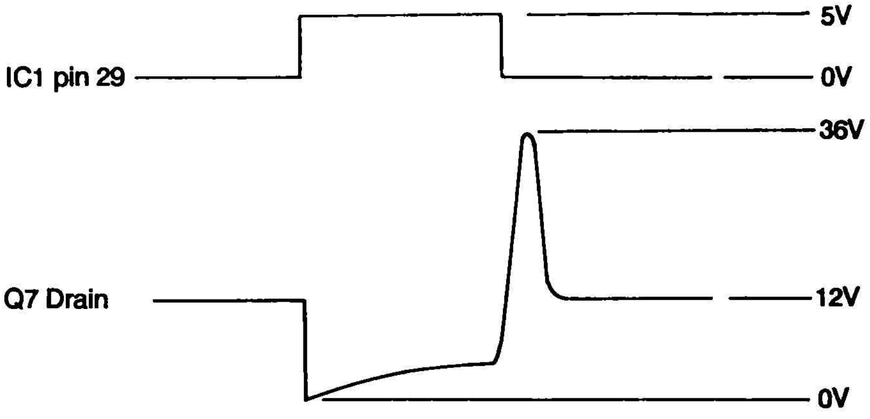
The print hammer drive circuit mainly consists of Q7, D13 and D14. The CPU (IC1) generates a signal for a specific amount of time. When the P64 of IC1 is turned to H level from L level, Q7 is turned on, activating the hammer solenoid. The current through the hammer solenoid is fixed at about 4 amps.

Schematic Diagram



Voltage Condition: At standby condition

Timing Chart



4.6.2 DC Motor Drive and Sensor Circuit

Paper feed and ribbon feed motors are +12 V bi-directional DC motors, controlled by IC10, which is able to drive two motors at different times. The driving motor (paper feed or ribbon feed) is selected by the signal received from Port 65 and 66 of CPU (IC1) and the direction of motor rotation (index or reverse index) is dependent on the signal received from Port 67 of IC1, as indicated in the truth table.

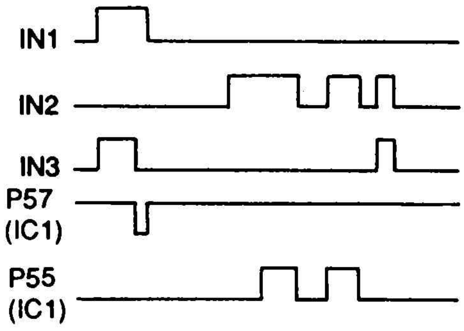
SW501 (ribbon feed sensor) is used to monitor the position of the drive cam by detecting the position of a magnet mounted on the Gear.

SW502 (paper feed sensor/carrier home sensor) is used to monitor the position of the intermediate gear by a cam mounted on the gear. And also SW502 is used to detect the carrier home position, when the power switch is turned on.

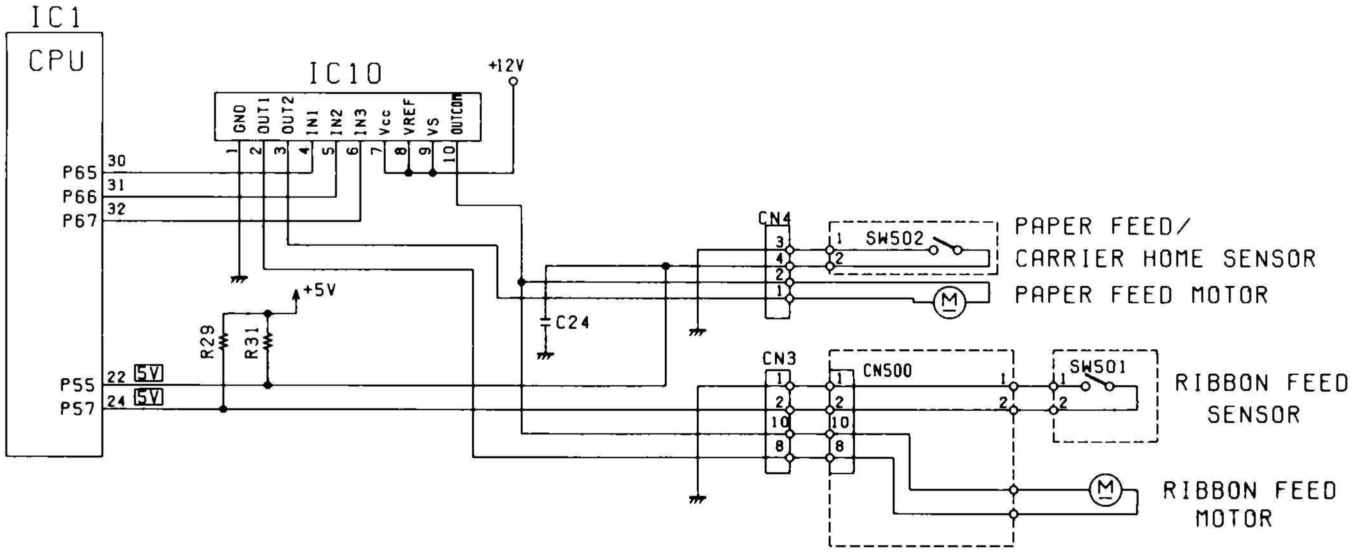
Truth Table

Input			Output			Function	
IN1	IN2	IN3	OUT1	OUT COM	OUT2	Ribbon Feed Motor Output OUT1, OUT COM	Paper Feed Motor Output OUT2, OUT COM
0	0	0	0	0	0	Braking	Braking
0	0	1	0	0	0	Braking	Braking
0	1	0	OFF	1	0	Open	↻ CW
0	1	1	OFF	0	1	Open	↺ CCW
1	0	0	0	1	OFF	↻ CW	Open
1	0	1	1	0	OFF	↺ CCW	Open
1	1	0	0	0	0	Braking	Braking
1	1	1	0	0	0	Braking	Braking

Timing Chart



Schematic Diagram



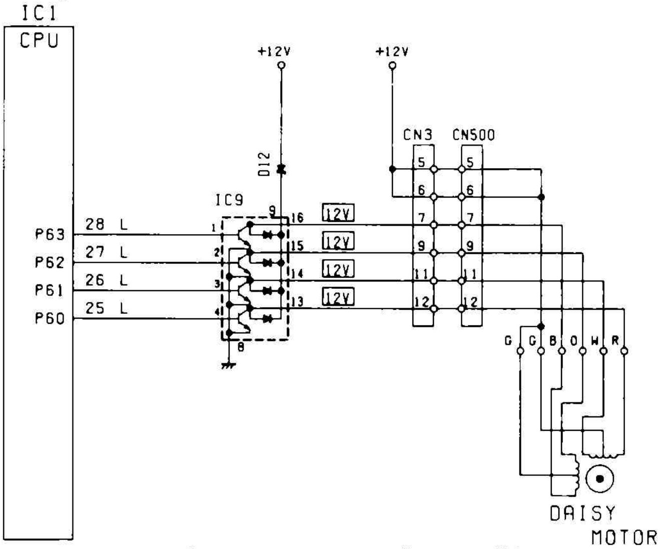
4.6.3 Daisywheel Motor and Carrier Spacing Motor Drive Circuit

The daisywheel motor and the carrier spacing motor are four-phase uni-polar PM type stepping motors. The stepping signal of the carrier spacing motor originates at P20, P21, P22 and P23 of IC1. The stepping signal of the daisywheel motor originates at P60, P61, P62 and P63 of IC1. These signals are sent to the transistor array IC9 and IC8.

A step/hold control line, supplied by P25 of IC1 controls the amount of current supplied to the motor while it is stepping or holding. When P25 of IC1 is Low, +VM is supplied through R26, R24 and R25 giving the motor less current while it is holding. When P25 of IC1 is High, +VM is supplied through Q6 ,R24 and R25 giving the motor extra current needed for stepping.

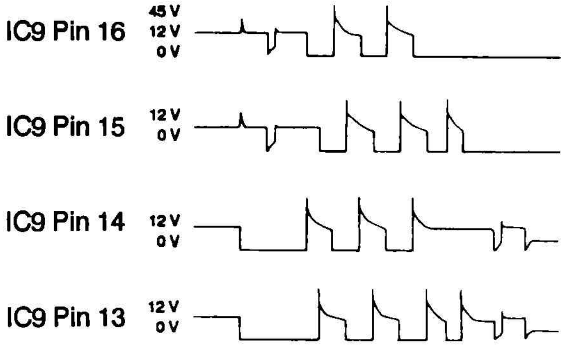
The daisywheel motor drive circuit does not have a voltage control circuit.

Daisywheel Motor Drive Circuit

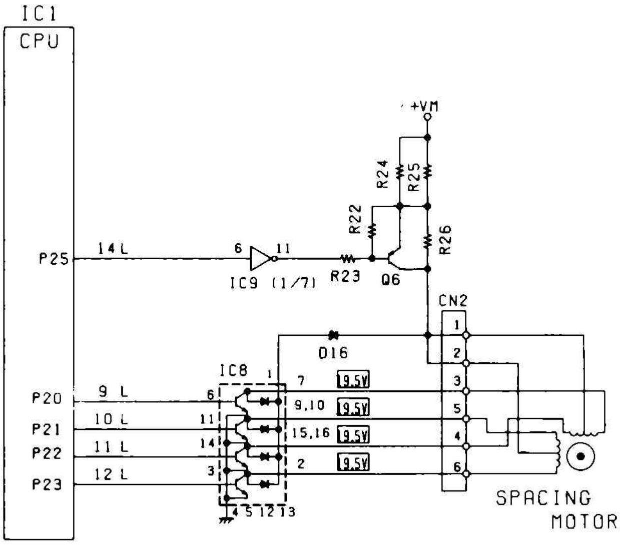


Voltage Condition: At standby condition
NOTE: VM = 19V At standby condition
VM = 13V-16V At printing condition

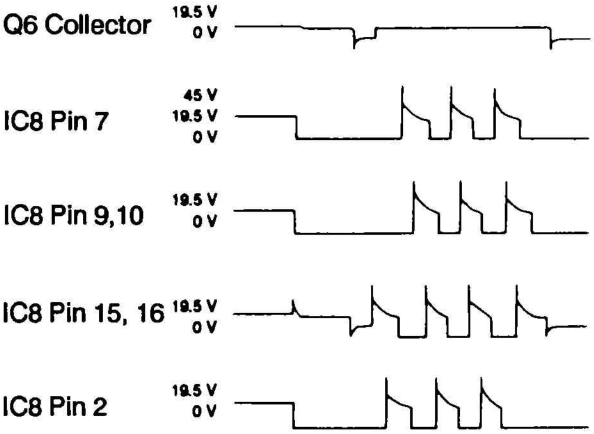
Timing Chart



Carrier Spacing Motor Drive Circuit



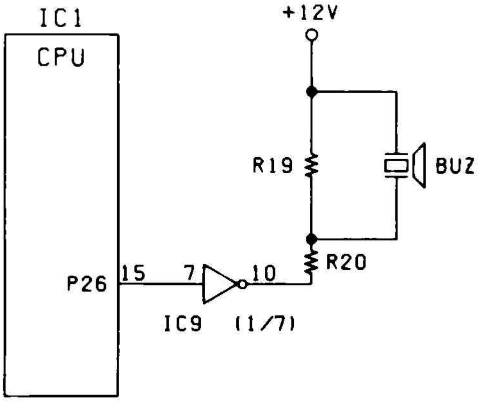
Timing Chart



Voltage Condition: At standby condition
NOTE: VM = 19V At standby condition
VM = 13V-16V At printing condition

4.6.4 Buzzer Circuit

The Buzzer receives a signal (about 2.3 kHz) from Port 26 (Pin 15) of IC1 which turns on or off IC9 (IN Pin 7, OUT Pin 10), driving the buzzer.



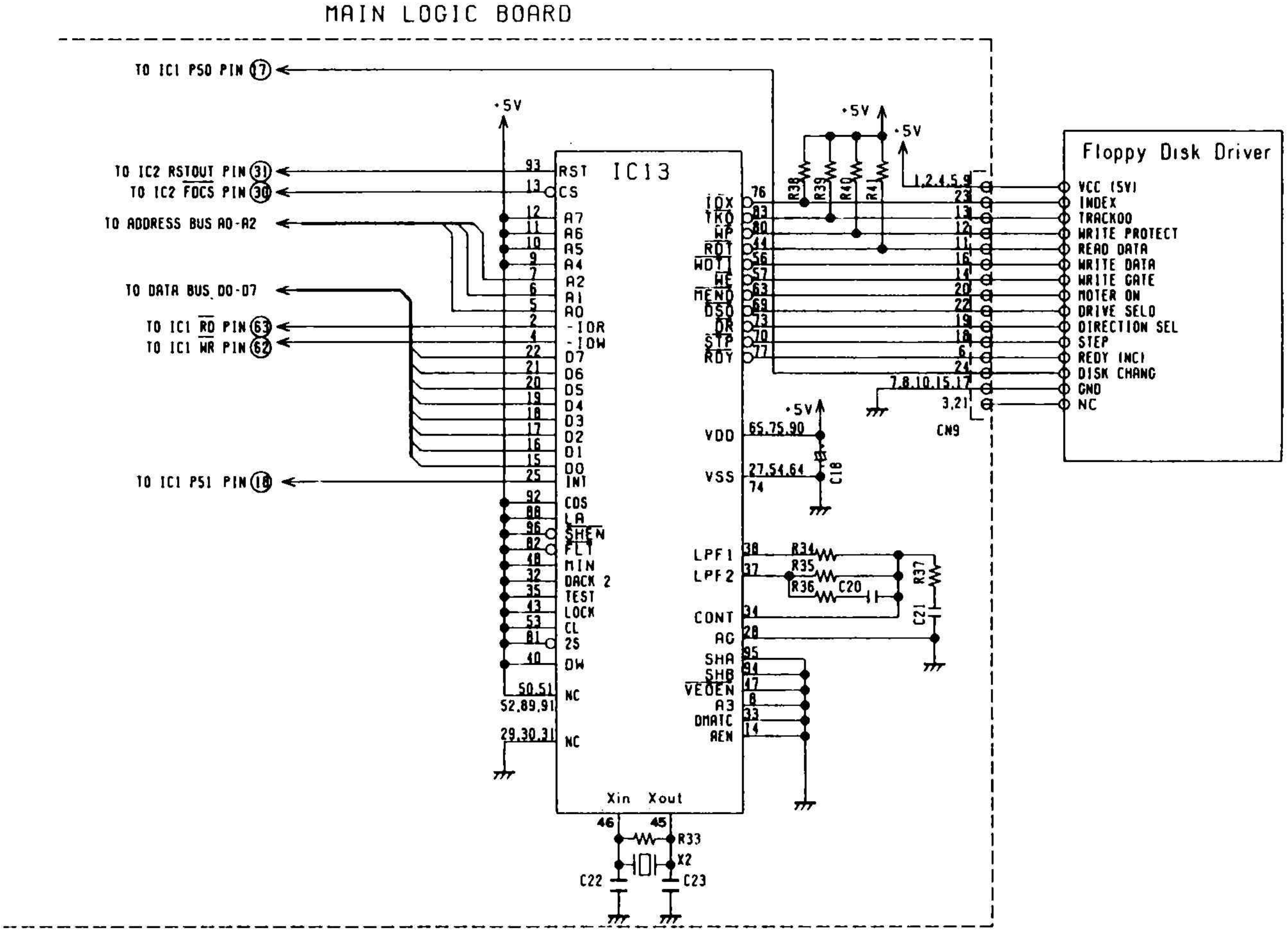
The Buzzer is mounted on the Logic Board and sounds under the following circumstances:

1) Sound of "A"
   - a) Carrier enters Hot Zone.
   - b) Carrier reaches right margin.
   - c) Depressing invalid function key.
   - d) Displaying CHECK RIBBON!.
   - e) Displaying CHECK PLATEN!.

2) Sound of "B"
   - a) Incorrect spelling is found.

4.7 Floppy Disk Controller

IC13 (TC8566AF) is used to interface between the CPU (IC1) and Floppy Disk Unit. IC13 consists of an FDC circuit and VFO.



1) FDC Circuit

This circuit has 4 registers which the CPU can access directly, and send a Write signal to the floppy disk unit in accordance with CPU command signal. Also, this circuit receives Read data (RDT), mixed clock and effective data from the floppy disk unit and switches this data to parallel data, and then sends data (D0-D7) to RAM.

2) VFO

Data, recorded on the disk, is composed of clock pulses (4 MHz) generated by FDC and effective data. When FDC reads this data, effective data pulses have to synchronize the data window pulse generated by VFO. For performing this synchronization, the data window pulse synchronizes the clock pulse by VFO.

3) TC8566AF (IC13) Pin Function

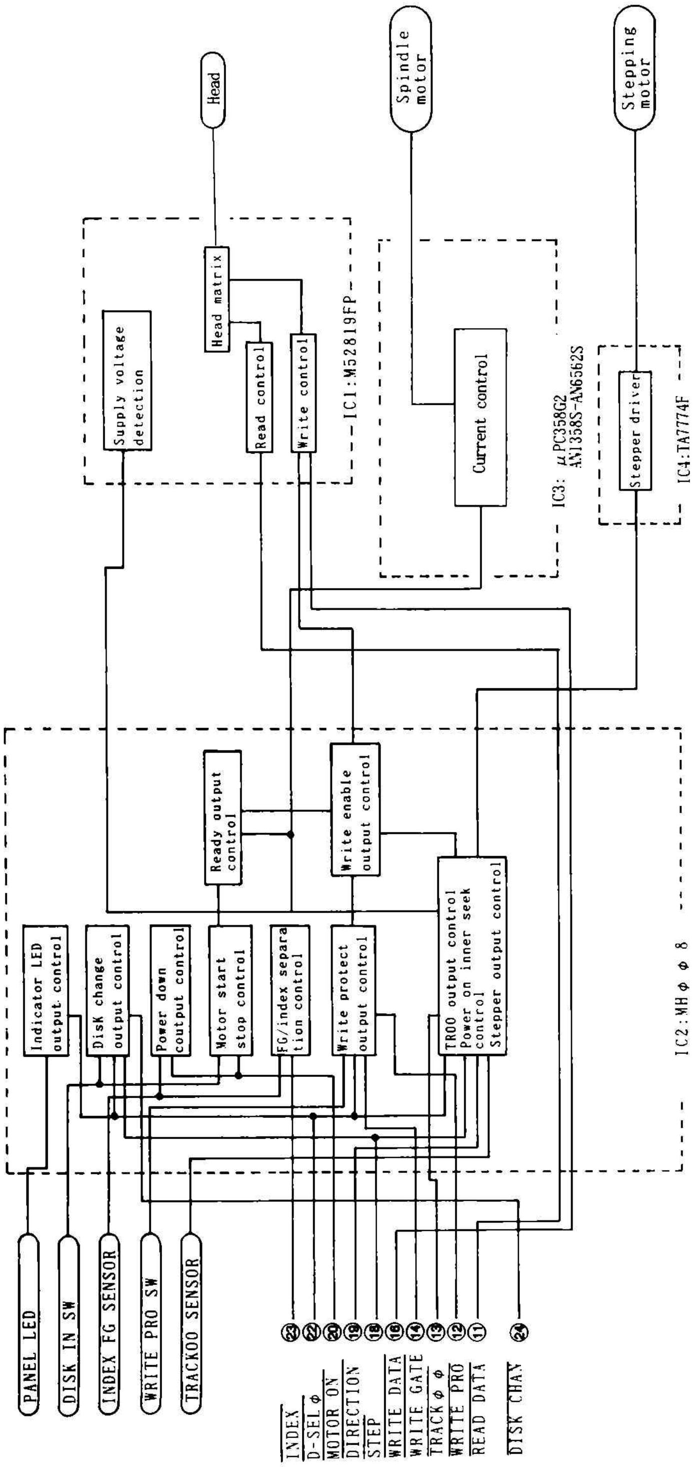
Pin No.	Signal Name	Description of Signal	Direction	Pin. No.	Signal Name	Description of Signal	Direction
1	C6	Not used	Out	51	NC	Pull up (+5 V)	—
2	–IOR	Read Strobe	In	52	NC	Pull up (+5 V)	—
3	—	Not used	—	53	CL	Pull up (+5 V)	In
4	–IOW	Write Strobe	In	54	Vss	Ground	—
5	A0	Address Bus	In	55	SYNC	Not used	Out
6	A1	Address Bus	In	56	$\overline{\text{WDT1}}$	FDD Write Signal	Out
7	A2	Address Bus	In	57	$\overline{\text{WE}}$	FDD Write Enable	Out
8	A3	Pull up (+5 V)	In	58	HS	Not used	Out
9	A4	Pull up (+5 V)	In	59	HL	Not used	Out
10	A5	Pull up (+5 V)	In	60	MEN3	Not used	Out
11	A6	Pull up (+5 V)	In	61	MEN2	Not used	Out
12	A7	Pull up (+5 V)	In	62	MEN1	Not used	Out
13	CS	Chip select	In	63	$\overline{\text{MEN0}}$	Drive A Motor ON	Out
14	AEN	Pull down (Ground)	In	64	Vss	Ground	—
15	D0	Data Bus	Bi-Direction	65	VDD	+ 5 V	—
16	D1	Data Bus	Bi-Direction	66	DS3	Not used	Out
17	D2	Data Bus	Bi-Direction	67	DS2	Not used	Out
18	D3	Data Bus	Bi-Direction	68	DS1	Not used	Out
19	D4	Data Bus	Bi-Direction	69	$\overline{\text{DS0}}$	Drive Sel 0	Out
20	D5	Data Bus	Bi-Direction	70	$\overline{\text{STP}}$	Step Signal	Out
21	D6	Data Bus	Bi-Direction	71	FR	Not used	Out
22	D7	Data Bus	Bi-Direction	72	LC	Not used	Out
23	DRQ2	Not used	Out	73	$\overline{\text{DR}}$	Direction Sel	Out
24	INTRQ	Not used	Out	74	Vss	Ground	—
25	INT	Interrupt Request	Out	75	VDD	+ 5 V	—
26	DRQ	Not used	Out	76	$\overline{\text{IDX}}$	Index Signal	In
27	Vss	Ground	—	77	$\overline{\text{RDY}}$	Read Signal	In
28	AG	Ground	—	78	—	Not used	—
29	NC	Pull down (Ground)	—	79	—	Not used	—
30	NC	Pull down (Ground)	—	80	$\overline{\text{WP}}$	Write Protect Signal	In
31	NC	Pull down (Ground)	—	81	2S	Pull up (+5 V)	In
32	DACK2	Pull up (+5 V)	In	82	$\overline{\text{FLT}}$	Pull up (+5 V)	In
33	DMATC	Pull down (Ground)	In	83	$\overline{\text{TKO}}$	Track 00 Signal	In
34	CONT	Filter Interrupt	In	84	PS1	Not used	Out
35	TEST	Pull up (+5 V)	In	85	PS0	Not used	Out
36	VCO	Not used	Bi-Direction	86	DSB	Not used	Out
37	LPF2	Low Pass Filter Output	Out	87	DSA	Not used	Out
38	LPF1	Low Pass Filter Output	Out	88	LA	Pull up (+5 V)	In
39	TRDT	Not used	Out	89	NC	Pull up (+5 V)	—
40	DW	Pull up (+5 V)	In	90	VDD	Pull up (+5 V)	—
41	RD/SK	Not used	Out	91	NC	Not used	—
42	TDW	Not used	Out	92	CDS	Pull up (+5 V)	In
43	LOCK	Pull up (+5 V)	In	93	RESET	Reset Signal	In
44	$\overline{\text{RDT}}$	Read Data Signal	In	94	SHB	Pull down (Ground)	In
45	XOUT	16 MHz Resonator	Out	95	SHA	Pull down (Ground)	In
46	XIN	16 MHz Resonator	In	96	$\overline{\text{SHEN}}$	Pull up (+5 V)	In
47	$\overline{\text{VFOEN}}$	Pull down (Ground)	In	97	STNBY	Not used	Out
48	MIN	Pull up (+5 V)	In	98	WDT	Not used	Out
49	MFM	Pull up (+5 V)	Out	99	ENID	Not used	Out
50	NC	Pull up (+5 V)	—	100	C4	Not used	Out

5. Floppy Disk Drive Unit

5.1 General Description

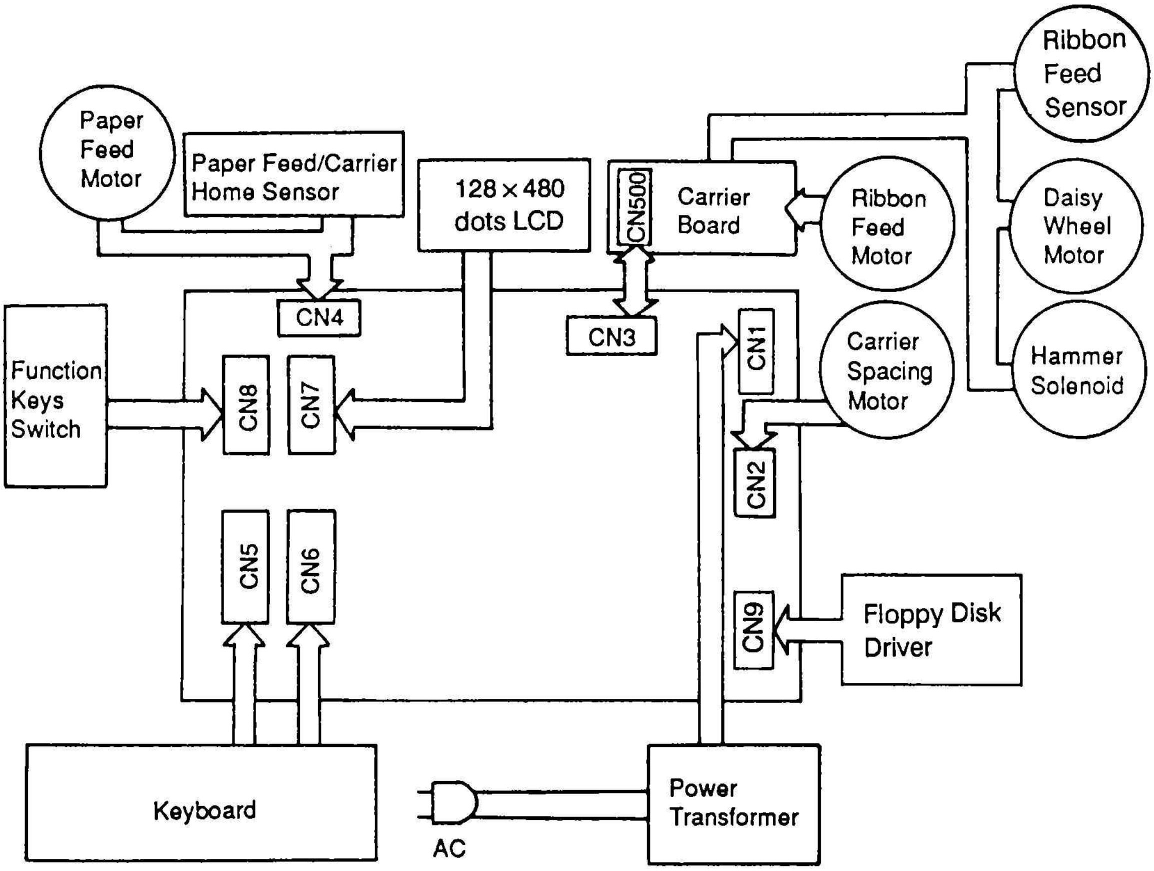
This micro floppy disk drive is able to write to or read from a 3.5 inch floppy disk which conforms to the MFD standard.
It is interface compatible with the 5 1/4 inch mini FDD and can record single sided/double density.

5.2 Block Diagram



6. Circuit Diagram and Trouble Shooting

6.1 Logic Board Connection Diagram



6.2 Explanation of Connectors

CN1 Power Transformer Connector

Pin No.	Signal Name	Color of Lead	
1	AC16 V	Red	For Electric Circuit
2	AC16 V	Red	For Electric Circuit

CN2 Carrier Spacing Motor Connector

Pin No.	Signal Name	Description of Signal	Direction
1	SCR	Carrier Spacing Motor Power Supply	Out
2	SCR		
3	CRA	Phase A for Carrier Spacing Motor Drive	Out
4	CRB	Phase B for Carrier Spacing Motor Drive	Out
5	$\overline{\text{CRA}}$	Phase $\overline{\text{A}}$ for Carrier Spacing Motor Drive	Out
6	$\overline{\text{CRB}}$	Phase $\overline{\text{B}}$ for Carrier Spacing Motor Drive	Out

CN3 Carrier Connector

Pin No.	Signal Name	Description of Signal	Direction
1	GND	Ground	—
2	RBS	Ribbon Sensor	In
3	HSE	Hammer Solenoid Enable	Out
4	HSE		
5	+12 V	+12 V	Out
6	+12 V		
7	DSA	Phase A for Daisywheel Motor Drive	Out
8	RBP	Phase (+) of Ribbon Feed Motor	Out
9	DSB	Phase B for Daisywheel Motor Drive	Out
10	RBN	Phase (–) of Ribbon Feed Motor	Out
11	$\overline{\text{DSA}}$	Phase $\overline{\text{A}}$ for Daisywheel Motor Drive	Out
12	$\overline{\text{DSB}}$	Phase $\overline{\text{B}}$ for Daisywheel Motor Drive	Out

CN4 Sensor Connector

Pin No.	Signal Name	Description of Signal	Direction
1	LFN	Phase (–) of Paper Feed Motor	Out
2	LFP	Phase (+) of Paper Feed Motor	Out
3	GND	Ground	—
4	LFS	LF/Carrier Sensor	In

CN5 Keyboard Connector 1

Pin No.	Signal Name	Description of Signal	Direction
1	P70	Key Data	In
2	P71		
3	P72		
4	P73		
5	P74		
6	P75		
7	P76		
8	P77		
9	NC	Not connected	—

CN6 Keyboard Connector 2

Pin No.	Signal Name	Description of Signal	Direction
1	KS9	Key Strobe	Out
2	KS8		
3	KS7		
4	KS6		
5	KS5		
6	KS4		
7	KS3		
8	KS2		
9	KS1		

CN7 80 Chr. × 14 Line LCD Connector

Pin No.	Signal Name	Description of Signal	Direction
1	GND	Ground	—
2	$\overline{RST}$	$\overline{RESET}$	Out
3	LCDE	Enable	Out
4	$R/\overline{W}$	$Read/\overline{Write}$	Out
5	A5	Address Bus	Out
6	A4		
7	D7	Data Bus	In/Out
8	D6		
9	D0		
10	D5		
11	D1		
12	D4		
13	D2		
14	D3		
15	WF	LCD Controller Signal	Out
16	DF		
17	LP		
18	+5 V	+5 V	Out
19	VEE	−18 V	Out
20	GND	Ground	—

CN500 Carrier Connector

Pin No.	Signal Name	Description of Signal	Direction
1	GND	Ground	—
2	RBS	Ribbon Sensor	In
3	HSE	Hammer Solenoid Enable	Out
4	HSE		
5	+12 V	+12 V	Out
6	+12 V		
7	DSA	Phase A for Daisywheel Motor Drive	Out
8	RBP	Phase (+) of Ribbon Feed Motor	Out
9	DSB	Phase B for Daisywheel Motor Drive	Out
10	RBN	Phase (−) of Ribbon Feed Motor	Out
11	$\overline{DSA}$	Phase $\overline{A}$ for Daisywheel Motor Drive	Out
12	$\overline{DSB}$	Phase $\overline{B}$ for Daisywheel Motor Drive	Out

CN8 Control Panel Connector

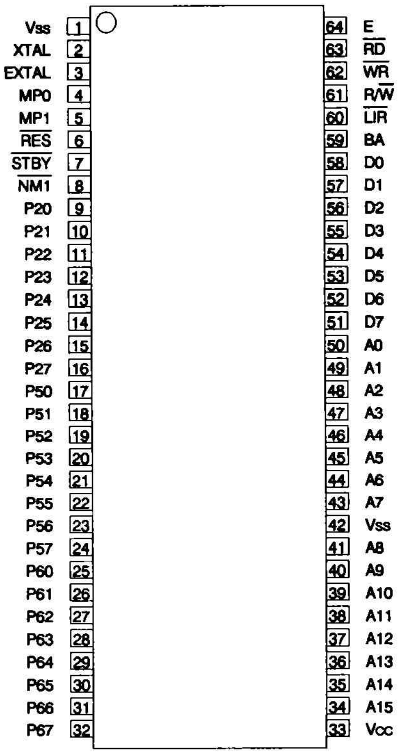
Pin No.	Signal Name	Description of Signal	Direction
1	KS11	Key Strobe	Out
2	KS10		
3	P74	Key Data	In
4	P73		
5	P72		
6	P71		
7	P70		

CN9 FDD Connector

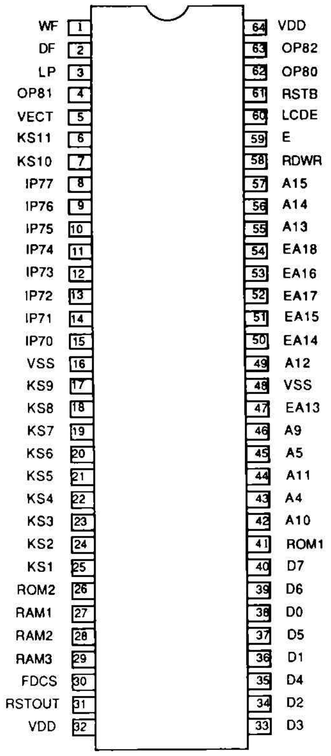
Pin No.	Signal Name	Description of Signal	Direction
1	+5 V	+5 V	In
2	+5 V		
3	NC	Not connected	—
4	+5 V	+5 V	In
5	+5 V		
6	$\overline{RDY}$	READY	In
7	GND	Ground	—
8	GND		
9	+5 V	+5 V	In
10	GND	Ground	—
11	$\overline{RDT}$	Read Data	In
12	$\overline{WP}$	Write Protect	In
13	$\overline{TK0}$	Track 00	In
14	$\overline{WE}$	Write Gate	Out
15	GND	Ground	—
16	$\overline{WDT1}$	Write Data	Out
17	GND	Ground	—
18	$\overline{STP}$	Step	Out
19	$\overline{DR}$	Direction Select	Out
20	$\overline{MENO}$	Motor ON	Out
21	NC	Not connected	—
22	$\overline{DS0}$	Drive Select 0	Out
23	$\overline{INDEX}$	Index	In
24	DISK CH	Disk Change	In

6.3 Component Reference Guide

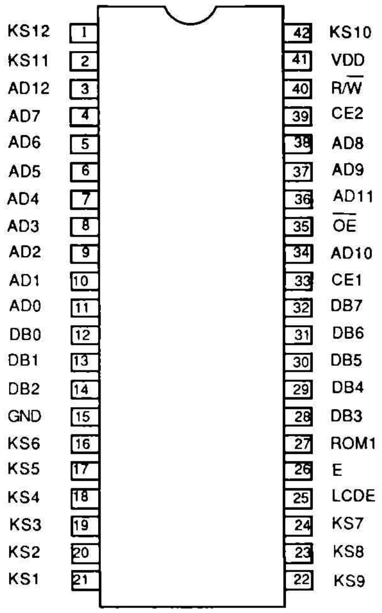
6.3.1 Logic Board



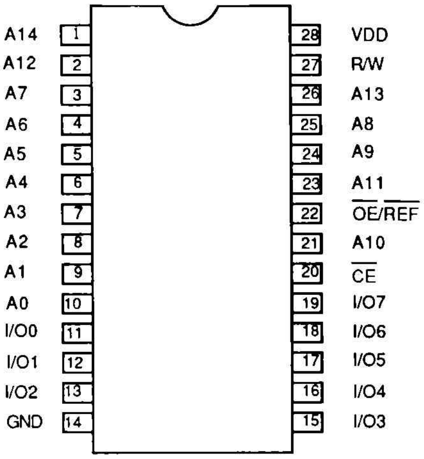
HD63B3XP
(IC1)



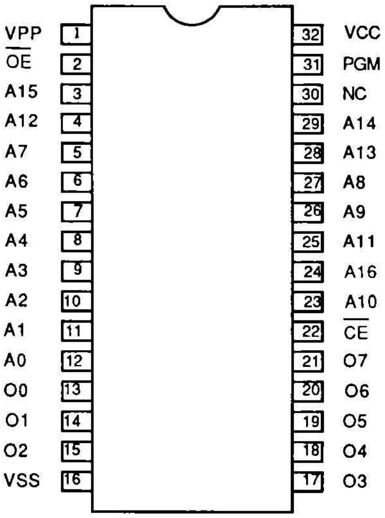
MB624165
(IC2)



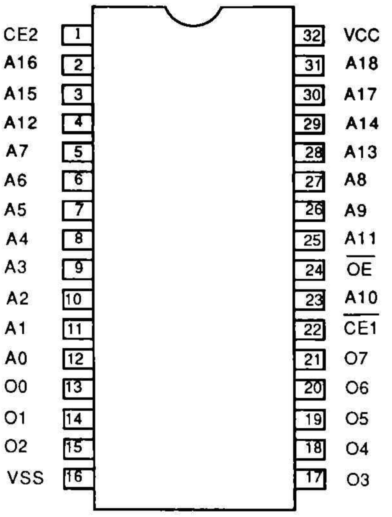
M6364MA
(IC3)



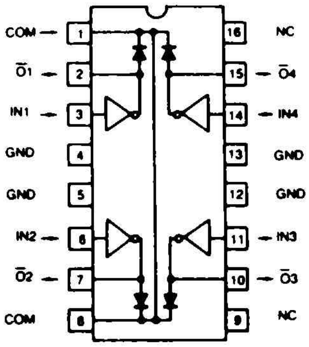
T51832PL
(IC4,5)



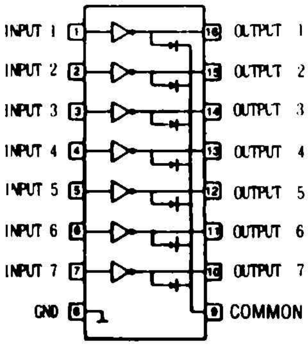
2W1000M
(IC6)



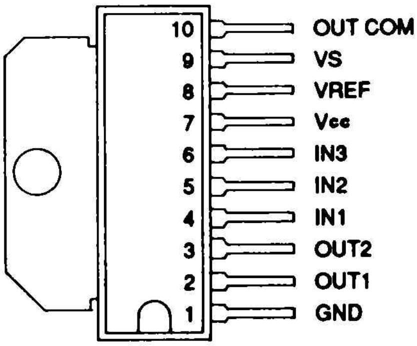
1W1000M
(IC7)



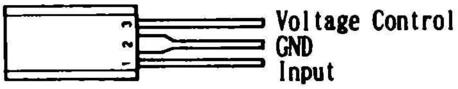
TD62064
(IC8)



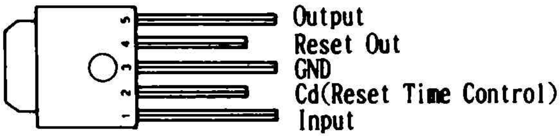
BA12003
(IC9)



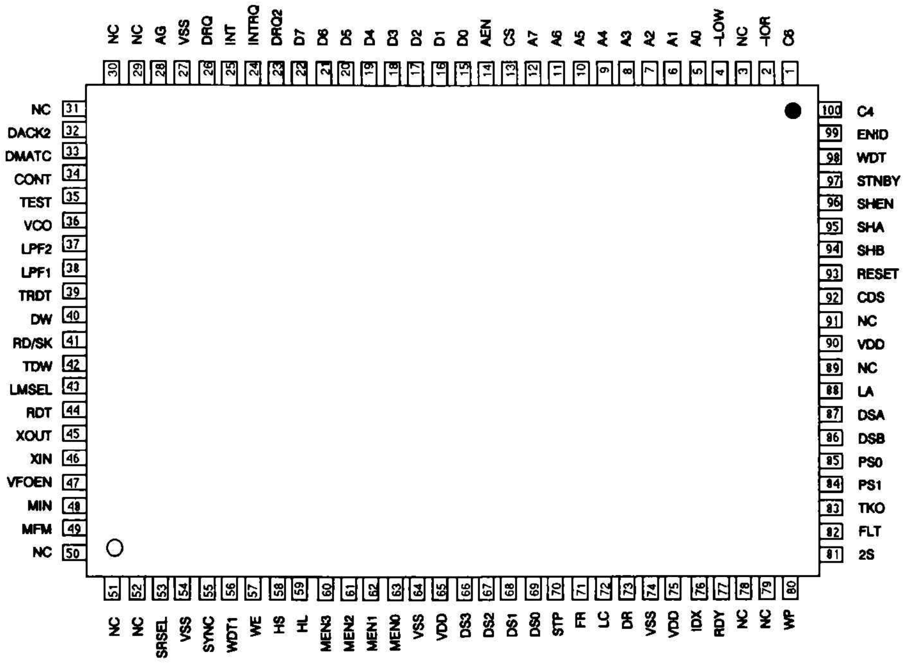
TA7288P
(IC10)



M5236L
(IC11)

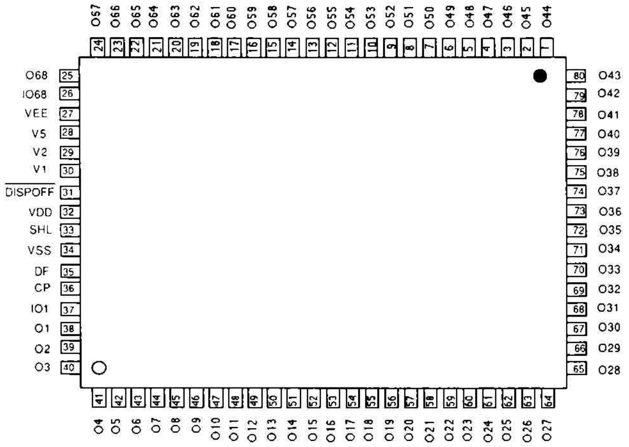


L78LR05C
(IC12)

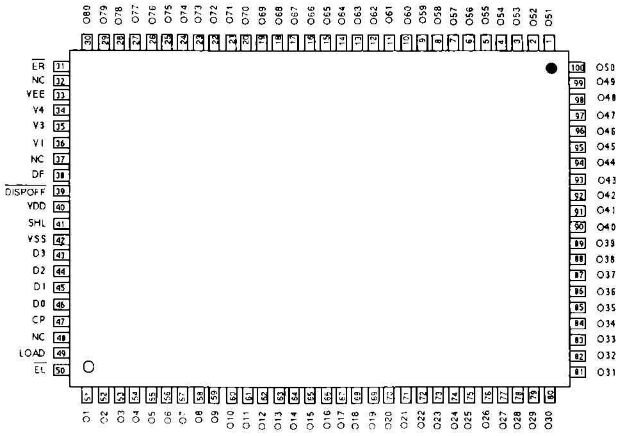


TC8566AF
(IC13)

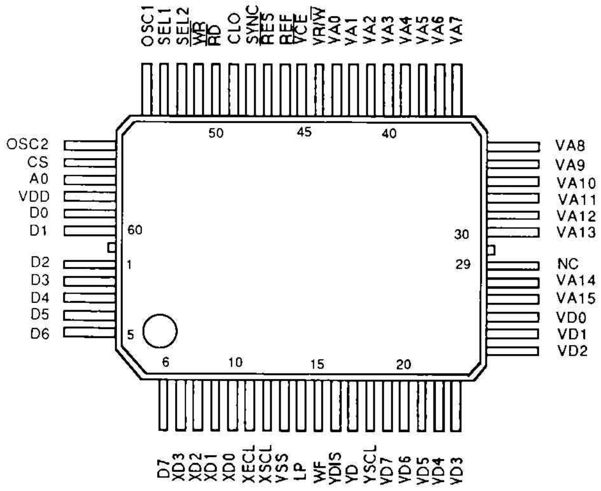
6.3.2 LCD Board



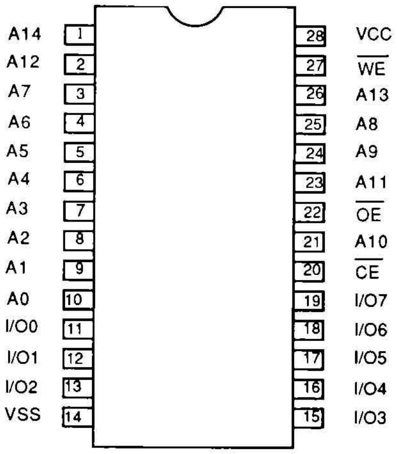
MSM5298A
(IC401,402)



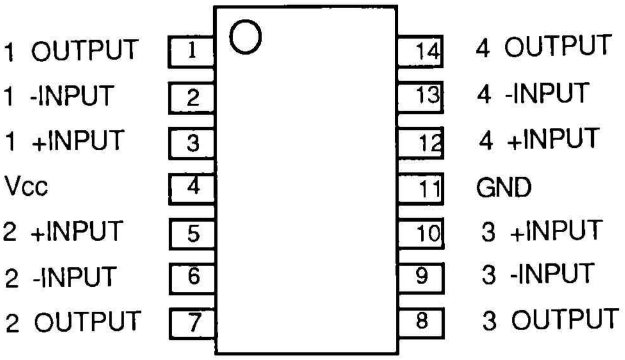
MSM5299A
(IC403-408)

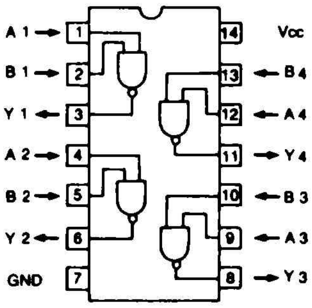

OSC1 SEL1 SEL2 WR RD CLO SYNC RES REF VCE VR/W VA0 VA1 VA2 VA3 VA4 VA5 VA6 VA7
OSC2
CS
A0
VDD
D0
D1
D2
D3
D4
D5
D6
VA8
VA9
VA10
VA11
VA12
VA13
NC
VA14
VA15
VD0
VD1
VD2
50
45
40
60
30
1
29
5
6
10
15
20
D7 XD3 XD2 XD1 XD0 XECL XSCL VSS LP WF YDIS YD YSCL VD7 VD6 VD5 VD4 VD3

SED1330F
(IC409)



H65256BF
(IC410)



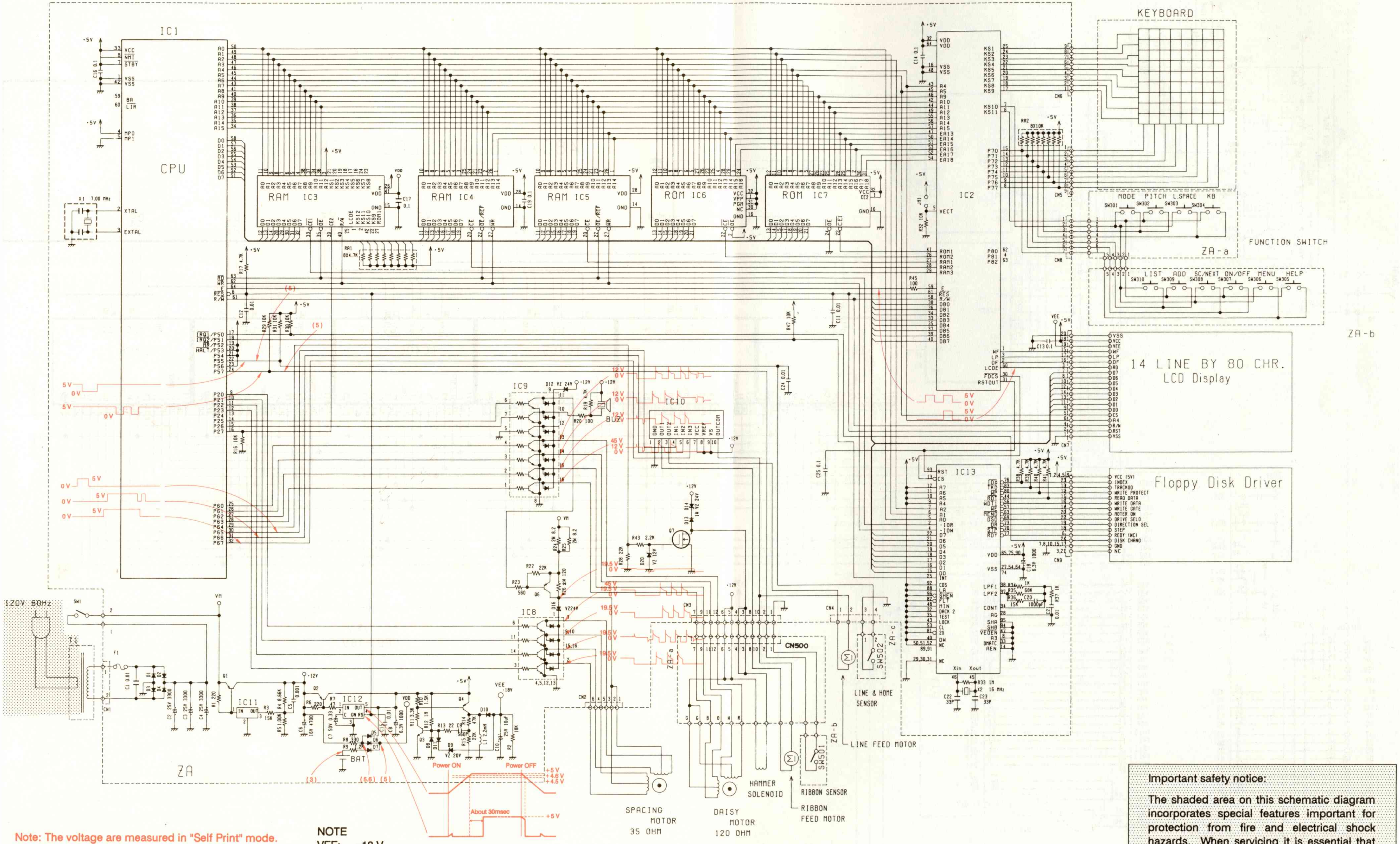


LA6324NM
(IC411)

74HC00AF
(IC412)

6.4 Schematic Diagrams

6.4.1 Logic Board Schematic



Note: The voltage are measured in "Self Print" mode.
( ): Standby condition

NOTE
VEE: −18 V
VM: +19 V AT STAND-BY CONDITION
+13 V-+16 V AT PRINTING CONDITION

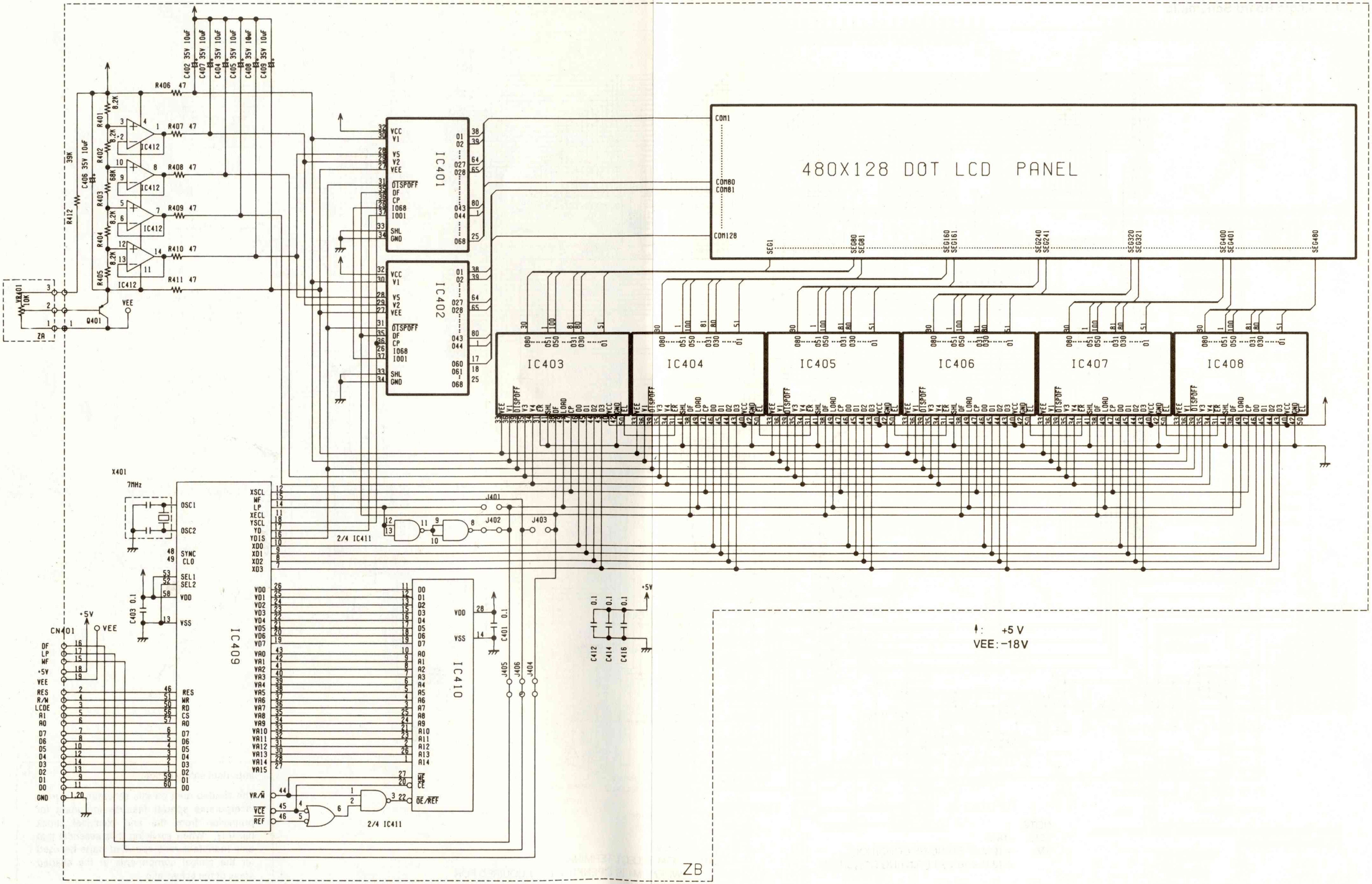
VDD: +5 V AT POWER ON CONDITION
+3 V AT POWER OFF CONDITION

↑: +5 V
JM1: ROM SELECT TERMINAL
WHEN JM1 IS OPENED, IC5 IS REQUIRED FOR OPERATING.

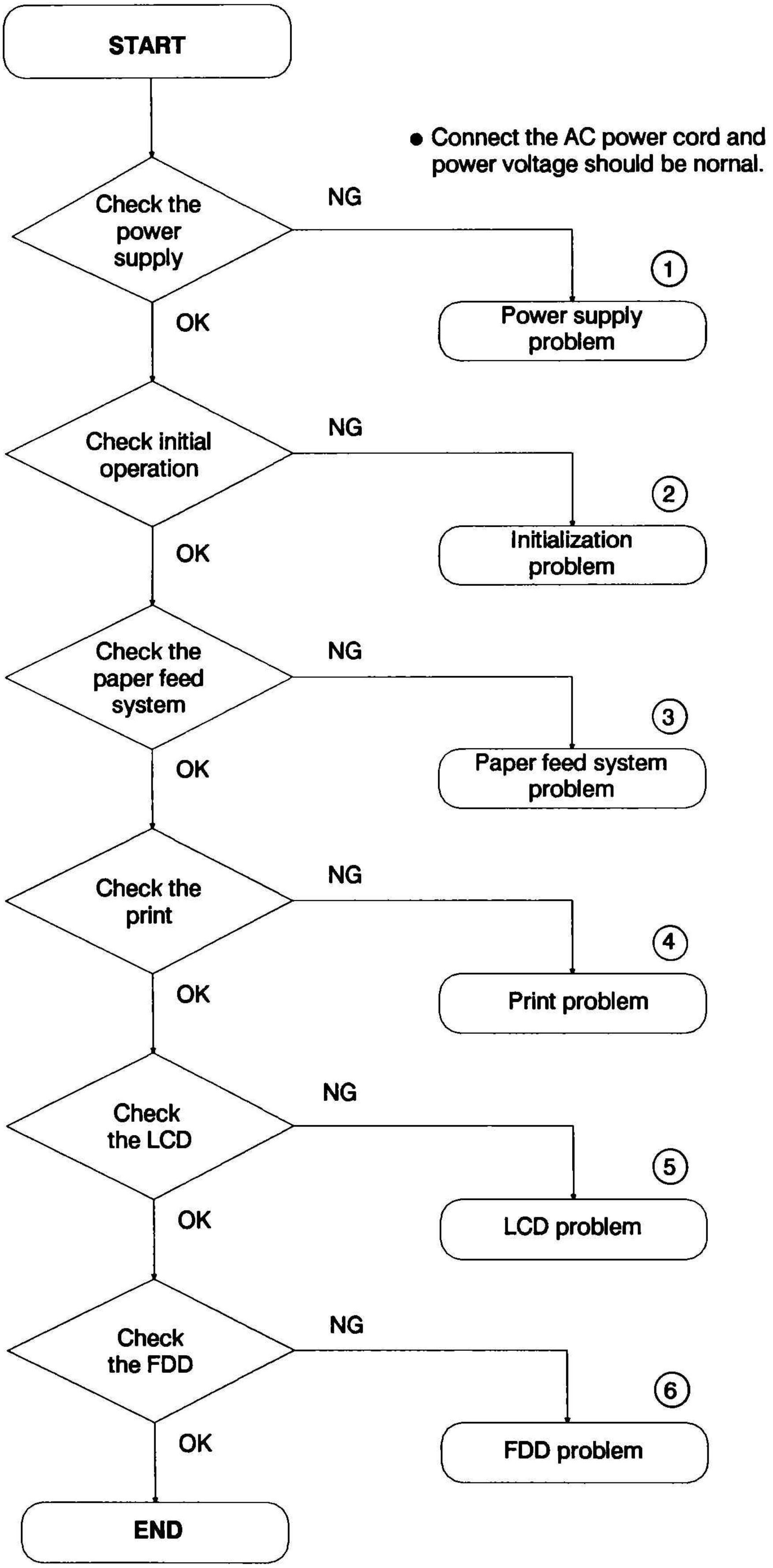
Important safety notice:

The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

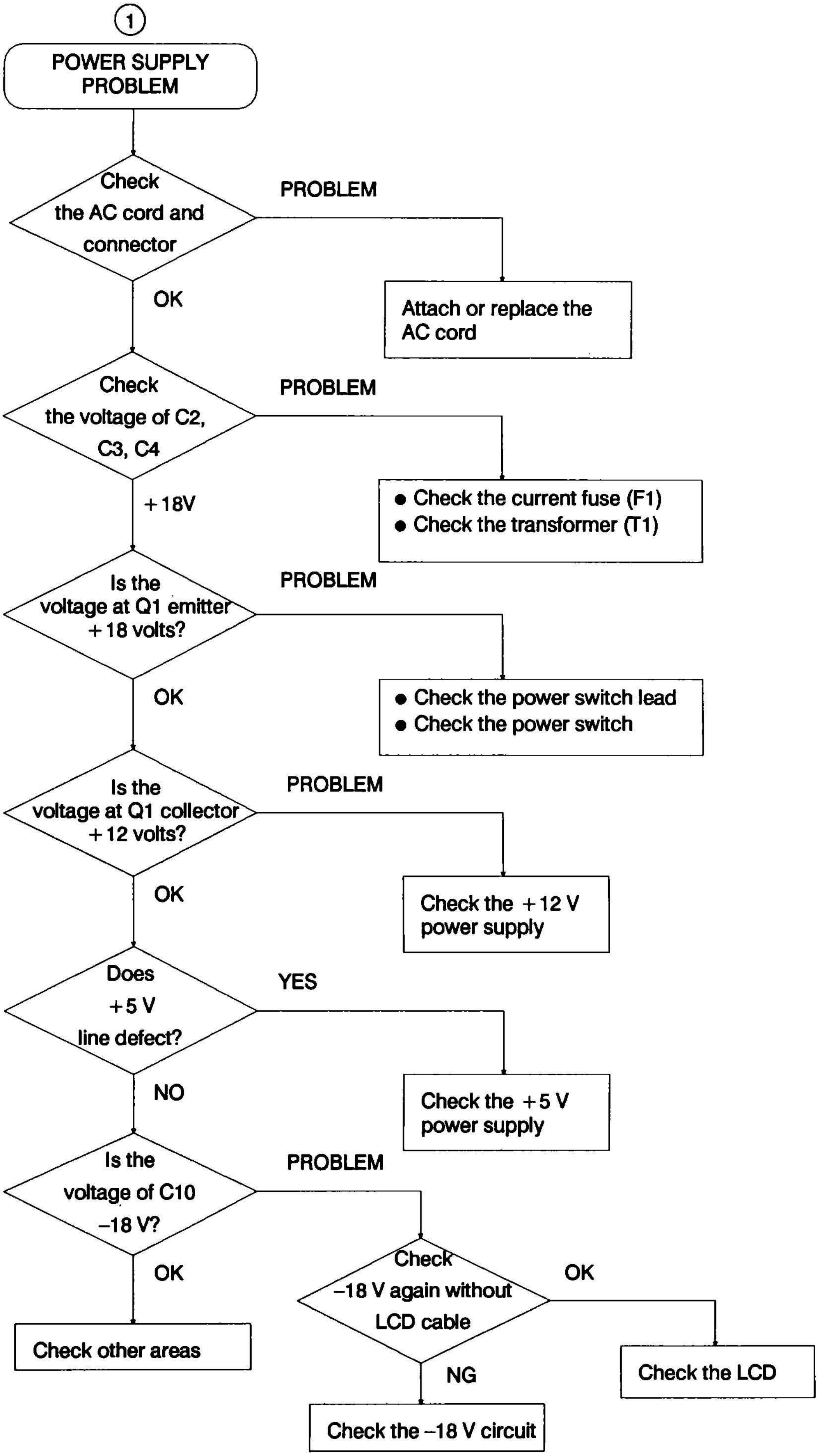
6.4. 2 LCD Board Schematic

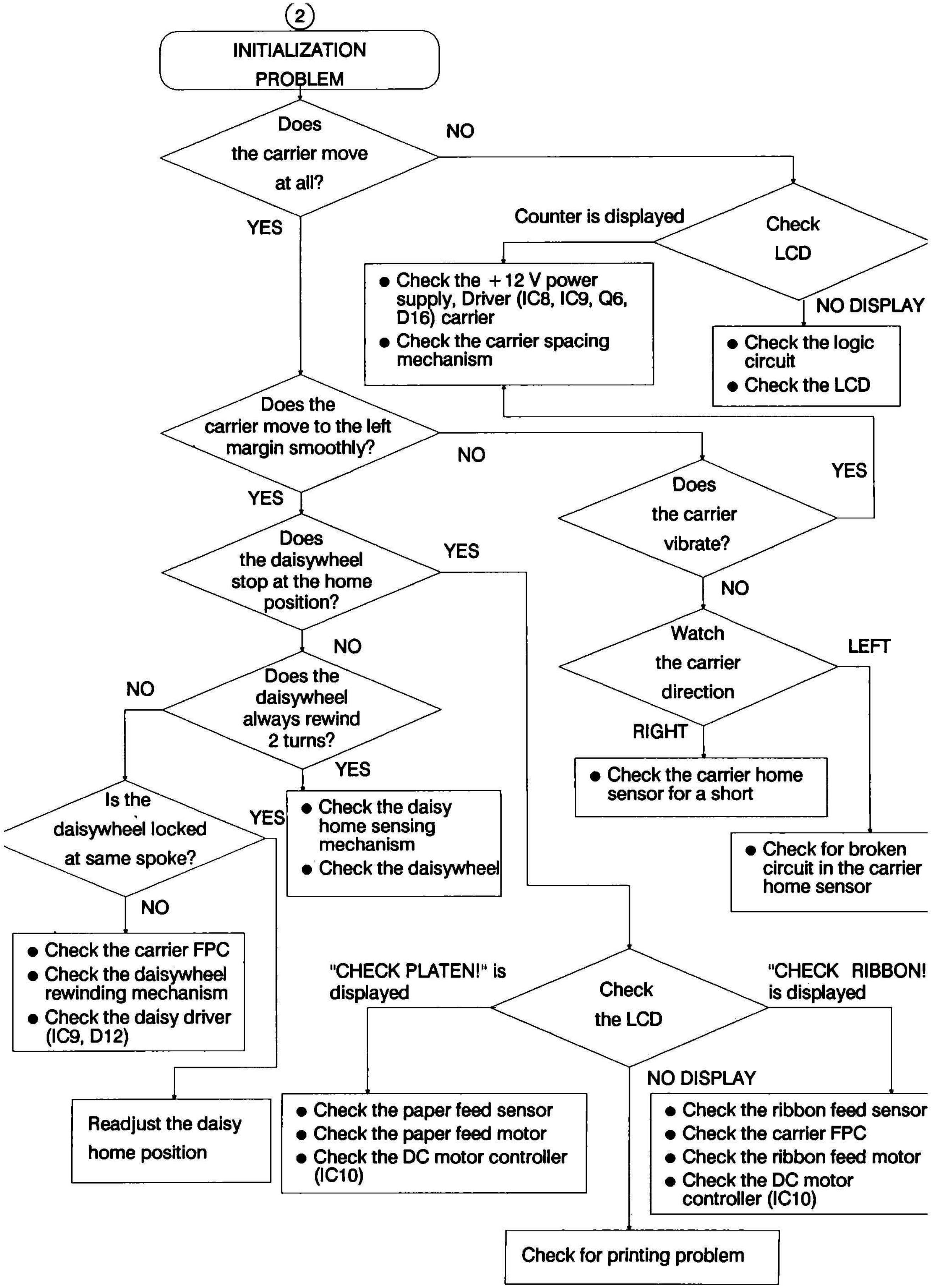


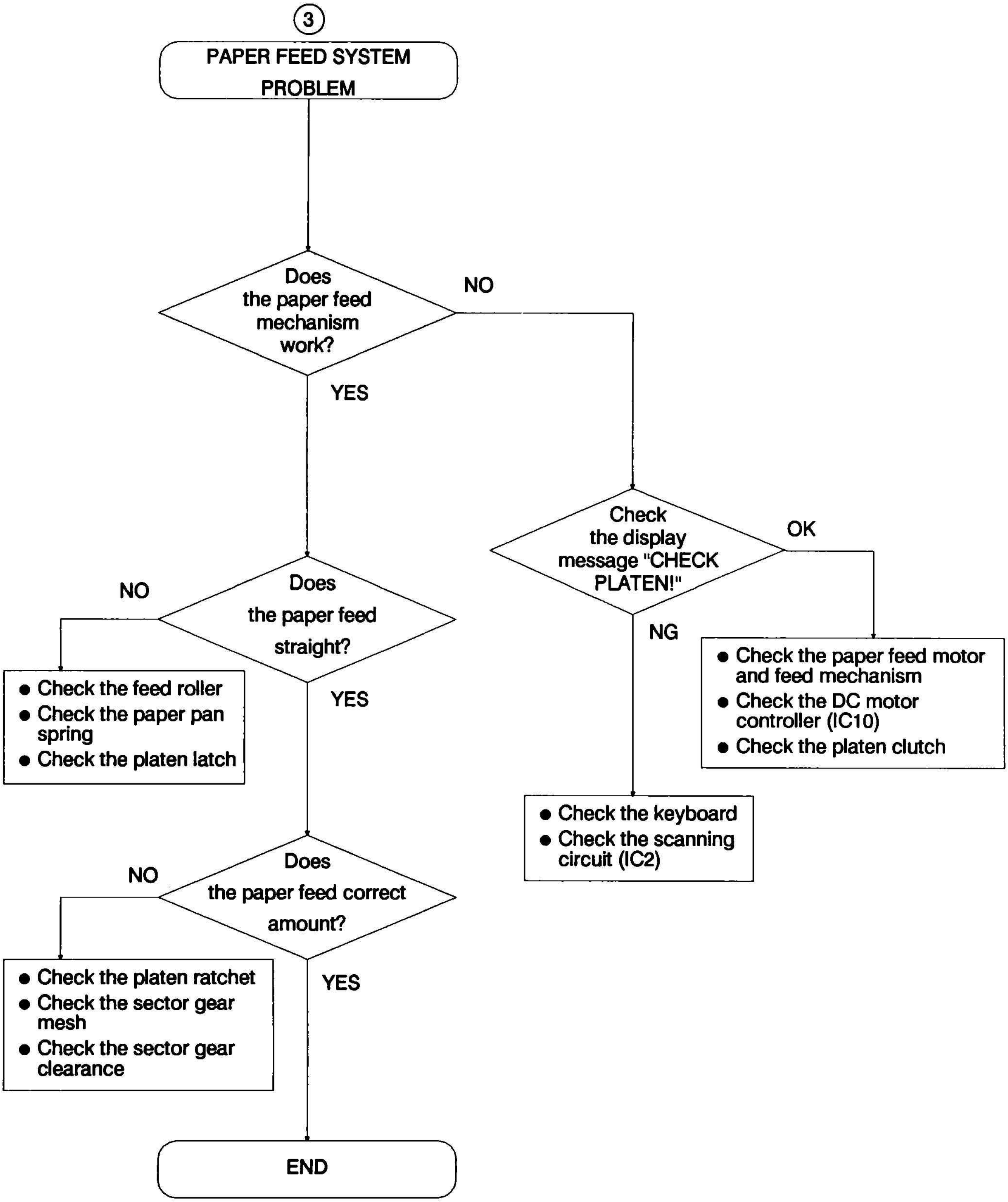
6.5 Trouble Shooting

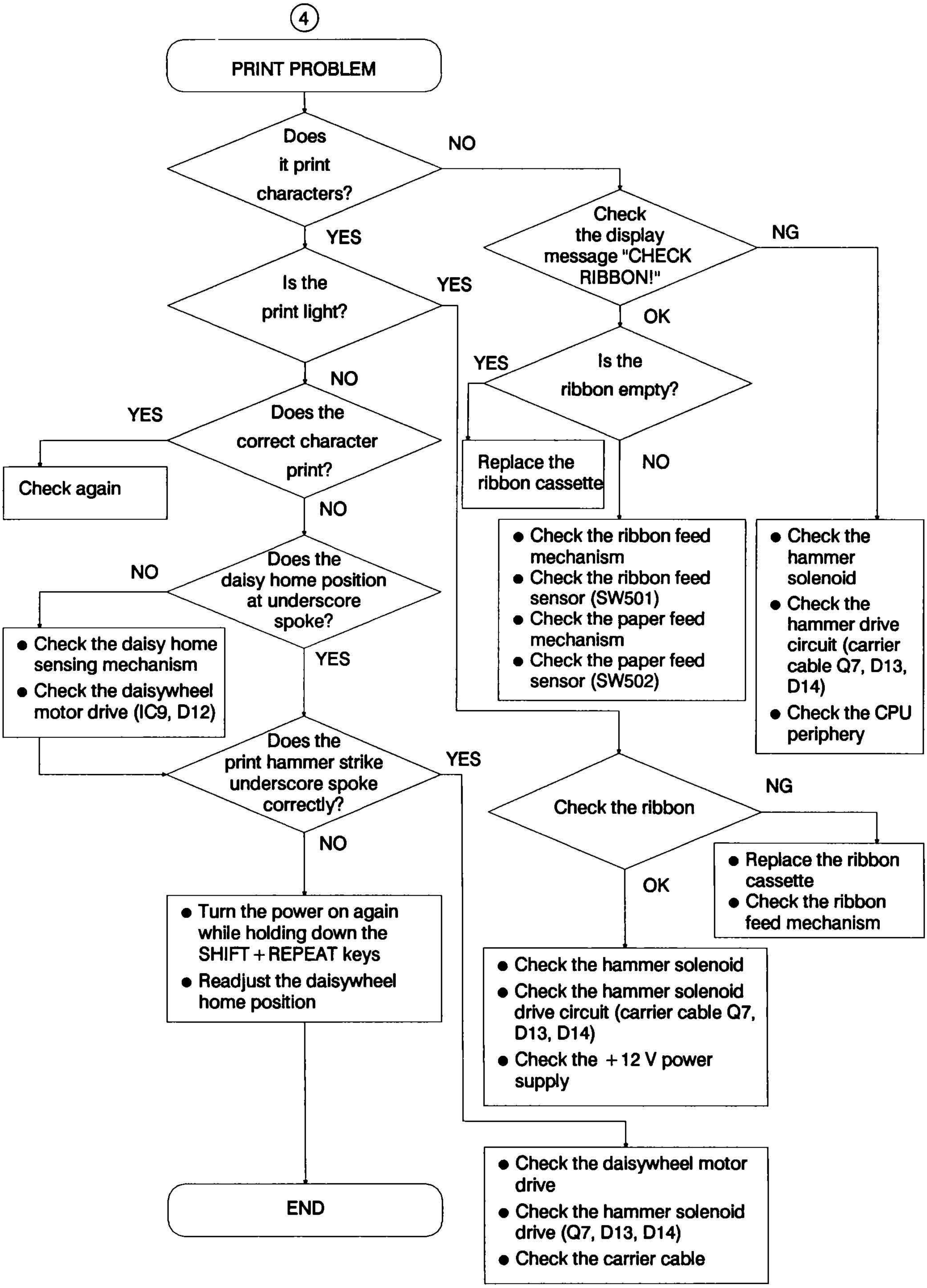


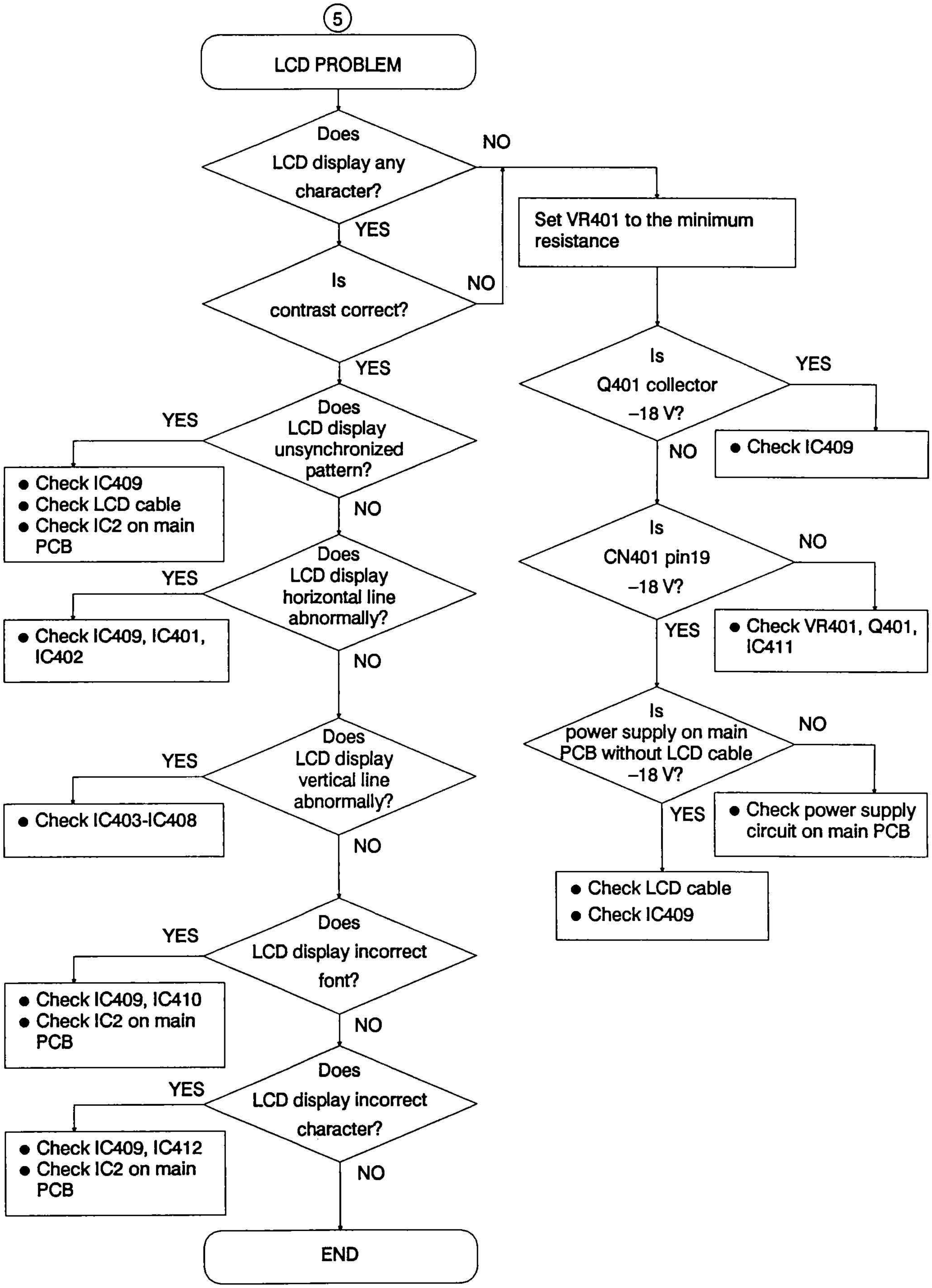
- Connect the AC power cord and power voltage should be nornal.

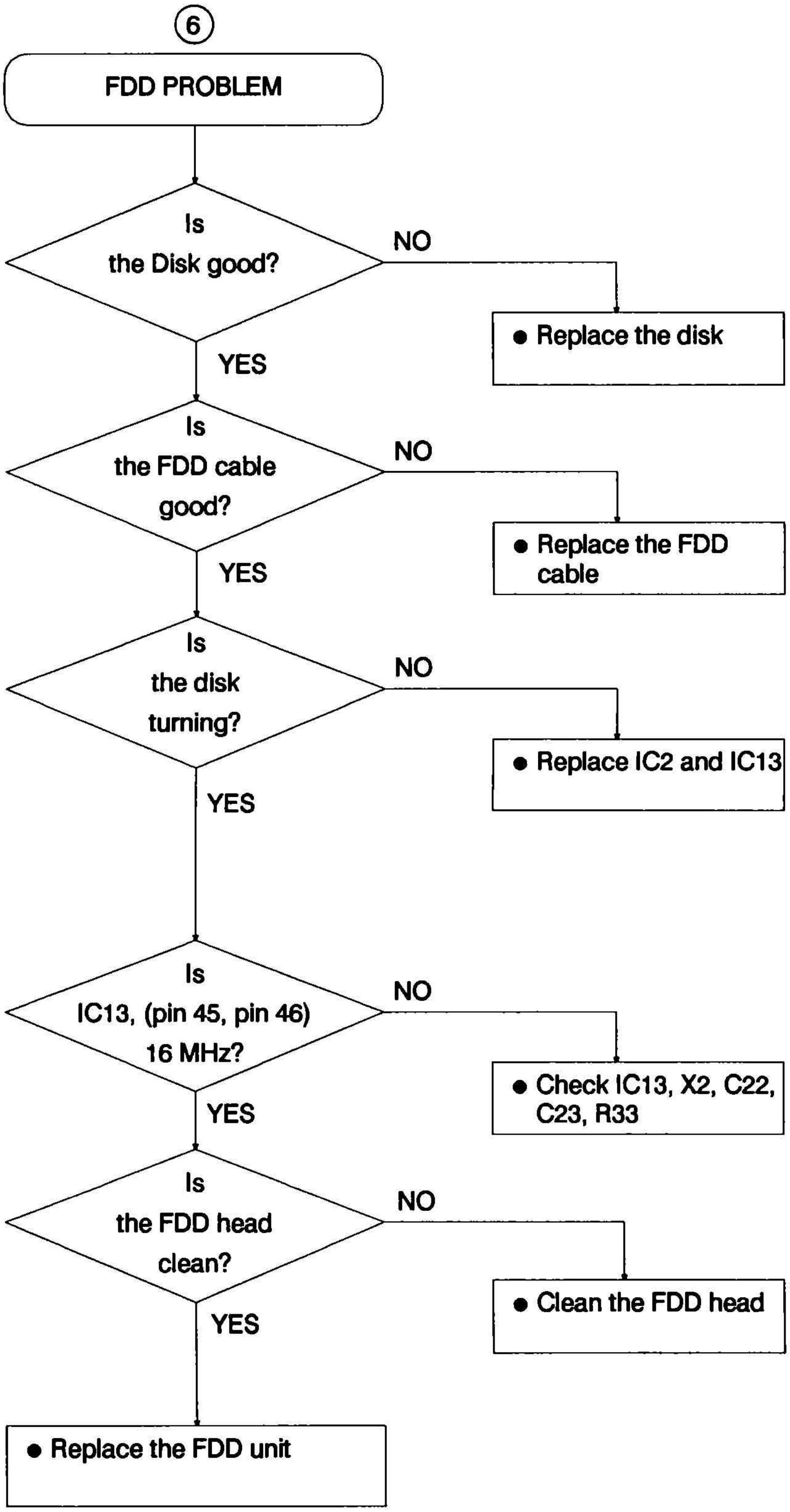

①
POWER SUPPLY PROBLEM
Check the AC cord and connector
PROBLEM
Attach or replace the AC cord
OK
Check the voltage of C2, C3, C4
PROBLEM
● Check the current fuse (F1)
● Check the transformer (T1)
+18V
Is the voltage at Q1 emitter +18 volts?
PROBLEM
● Check the power switch lead
● Check the power switch
OK
Is the voltage at Q1 collector +12 volts?
PROBLEM
Check the +12 V power supply
OK
Does +5 V line defect?
YES
Check the +5 V power supply
NO
Is the voltage of C10 −18 V?
PROBLEM
Check −18 V again without LCD cable
OK
Check the LCD
NG
Check the −18 V circuit
OK
Check other areas


②
INITIALIZATION PROBLEM
Does the carrier move at all?
NO
YES
Check LCD
Counter is displayed
NO DISPLAY
● Check the +12 V power supply, Driver (IC8, IC9, Q6, D16) carrier
● Check the carrier spacing mechanism
● Check the logic circuit
● Check the LCD
Does the carrier move to the left margin smoothly?
NO
YES
Does the carrier vibrate?
YES
NO
Watch the carrier direction
LEFT
RIGHT
● Check the carrier home sensor for a short
● Check for broken circuit in the carrier home sensor
Does the daisywheel stop at the home position?
YES
NO
Does the daisywheel always rewind 2 turns?
NO
YES
● Check the daisy home sensing mechanism
● Check the daisywheel
Is the daisywheel locked at same spoke?
YES
NO
● Check the carrier FPC
● Check the daisywheel rewinding mechanism
● Check the daisy driver (IC9, D12)
Readjust the daisy home position
Check the LCD
"CHECK PLATEN!" is displayed
"CHECK RIBBON! is displayed
NO DISPLAY
● Check the paper feed sensor
● Check the paper feed motor
● Check the DC motor controller (IC10)
● Check the ribbon feed sensor
● Check the carrier FPC
● Check the ribbon feed motor
● Check the DC motor controller (IC10)
Check for printing problem


③
PAPER FEED SYSTEM PROBLEM
Does the paper feed mechanism work?
NO
YES
Check the display message "CHECK PLATEN!"
OK
NG
Check the paper feed motor and feed mechanism
Check the DC motor controller (IC10)
Check the platen clutch
Check the keyboard
Check the scanning circuit (IC2)
Does the paper feed straight?
NO
Check the feed roller
Check the paper pan spring
Check the platen latch
YES
Does the paper feed correct amount?
NO
Check the platen ratchet
Check the sector gear mesh
Check the sector gear clearance
YES
END


④
PRINT PROBLEM
Does it print characters?
NO
YES
Check the display message "CHECK RIBBON!"
NG
OK
Is the print light?
YES
NO
Is the ribbon empty?
YES
NO
Replace the ribbon cassette
Does the correct character print?
YES
NO
Check again
● Check the ribbon feed mechanism
● Check the ribbon feed sensor (SW501)
● Check the paper feed mechanism
● Check the paper feed sensor (SW502)
● Check the hammer solenoid
● Check the hammer drive circuit (carrier cable Q7, D13, D14)
● Check the CPU periphery
Does the daisy home position at underscore spoke?
NO
YES
● Check the daisy home sensing mechanism
● Check the daisywheel motor drive (IC9, D12)
Does the print hammer strike underscore spoke correctly?
YES
NO
Check the ribbon
NG
OK
● Replace the ribbon cassette
● Check the ribbon feed mechanism
● Turn the power on again while holding down the SHIFT + REPEAT keys
● Readjust the daisywheel home position
● Check the hammer solenoid
● Check the hammer solenoid drive circuit (carrier cable Q7, D13, D14)
● Check the +12 V power supply
END
● Check the daisywheel motor drive
● Check the hammer solenoid drive (Q7, D13, D14)
● Check the carrier cable

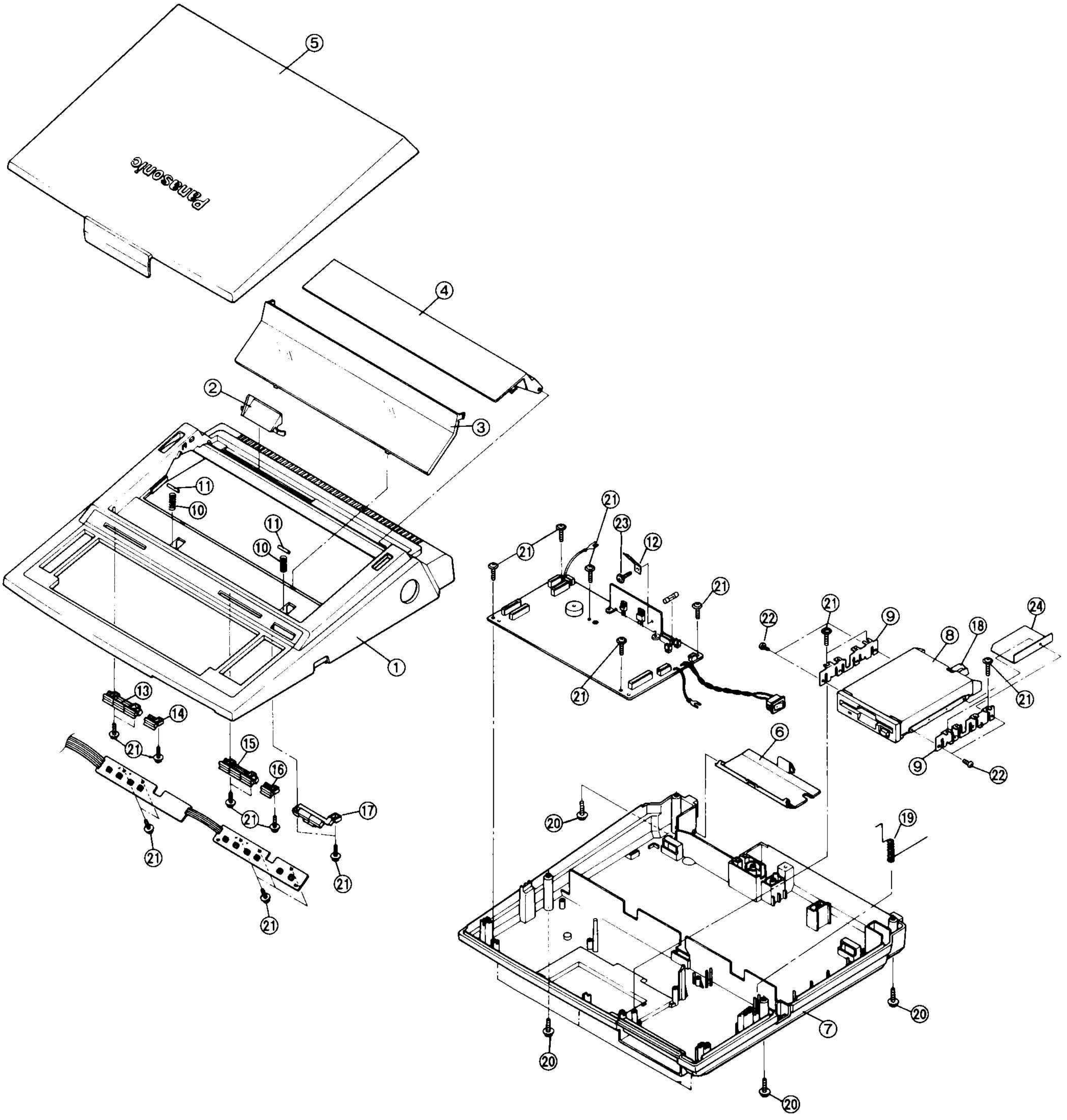

5
LCD PROBLEM
Does LCD display any character?
NO
YES
Is contrast correct?
NO
YES
Does LCD display unsynchronized pattern?
YES
● Check IC409
● Check LCD cable
● Check IC2 on main PCB
NO
Does LCD display horizontal line abnormally?
YES
● Check IC409, IC401, IC402
NO
Does LCD display vertical line abnormally?
YES
● Check IC403-IC408
NO
Does LCD display incorrect font?
YES
● Check IC409, IC410
● Check IC2 on main PCB
NO
Does LCD display incorrect character?
YES
● Check IC409, IC412
● Check IC2 on main PCB
NO
END
Set VR401 to the minimum resistance
Is Q401 collector –18 V?
YES
● Check IC409
NO
Is CN401 pin19 –18 V?
NO
● Check VR401, Q401, IC411
YES
Is power supply on main PCB without LCD cable –18 V?
NO
● Check power supply circuit on main PCB
YES
● Check LCD cable
● Check IC409


⑥
FDD PROBLEM
Is the Disk good?
NO
● Replace the disk
YES
Is the FDD cable good?
NO
● Replace the FDD cable
YES
Is the disk turning?
NO
● Replace IC2 and IC13
YES
Is IC13, (pin 45, pin 46) 16 MHz?
NO
● Check IC13, X2, C22, C23, R33
YES
Is the FDD head clean?
NO
● Clean the FDD head
YES
● Replace the FDD unit

7. Parts Catalog and Lubrication Points

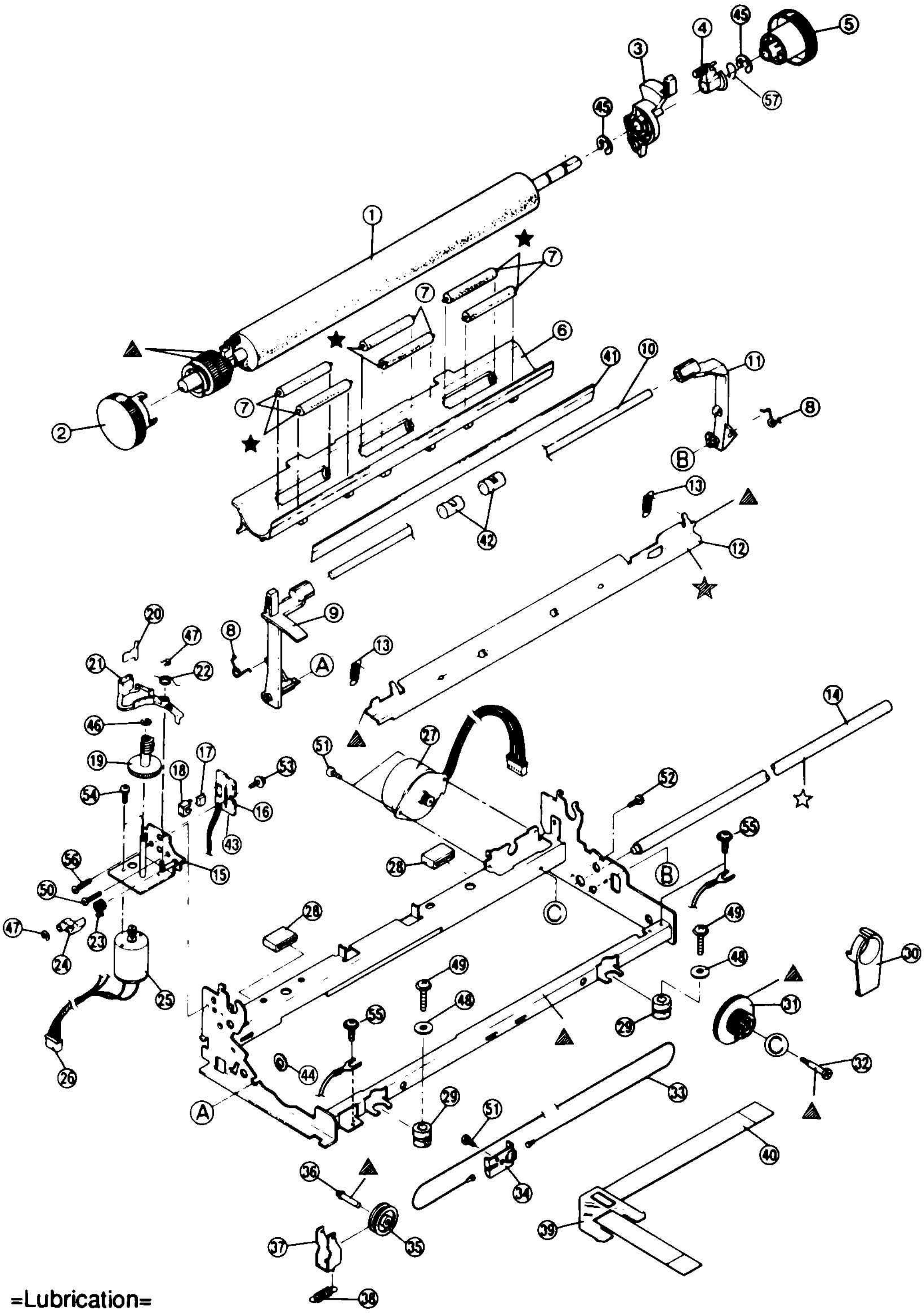
NOTES:
1. Important safety notice.
   Components identified by ⚠ mark have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's specified parts.
2. The S mark is for service standard parts and may differ from production parts.
3. The * mark designates parts available during the production period only.

1. Covers



Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
1-1	PJYFW1000M	Upper Cover Assembly	1	
1-2	PJKE91Z	Paper Guide	1	
1-3	PJKK67Z	Front Cover	1	
1-4	PJKE89Z	Paper Stand	1	
1-5	PJKK9019Z	Hard Cover	1	
1-6	PJKE90Z	AC Cord Cover	1	
1-7	PJYMW1000M	Bottom Cover Assembly	1	
1-8	EME-113K	Floppy Disk Drive Complete	1	*
1-9	PJMD9112Z	FDD Plate	2	
1-10	PJDS5361Z	Tilt Spring	2	
1-11	PJDF9130Z	Tilt Shaft	2	
1-12	PJUS94Y	FG Plate	1	
1-13	PJBC25Z	Knob. Tact Switch (Gray)	1	
1-14	PJBC27Z	Knob. Tact Switch (Gray)	1	
1-15	PJBC25Y	Knob. Tact Switch (Blue)	1	
1-16	PJBC27Y	Knob. Tact Switch (Green)	1	
1-17	PJBC26Z	Function Knob	1	
1-18	PJJE147Z	FDD Cable	1	
1-19	PJDS9250Z	FG Spring	1	
1-20	XTW3+14SFZ	Screw 3×14 mm	8	
1-21	XTW3+10S	Screw 3×10 mm	22	
1-22	XSN3+6	Screw 3×6 mm	4	
1-23	XTW26+6F	Screw 2.6×6 mm	1	
1-24	PJMC106Z	Shield Plate	1	

2. Chassis and Platen



=Lubrication=

▲ PJOL-G311S (Grease)

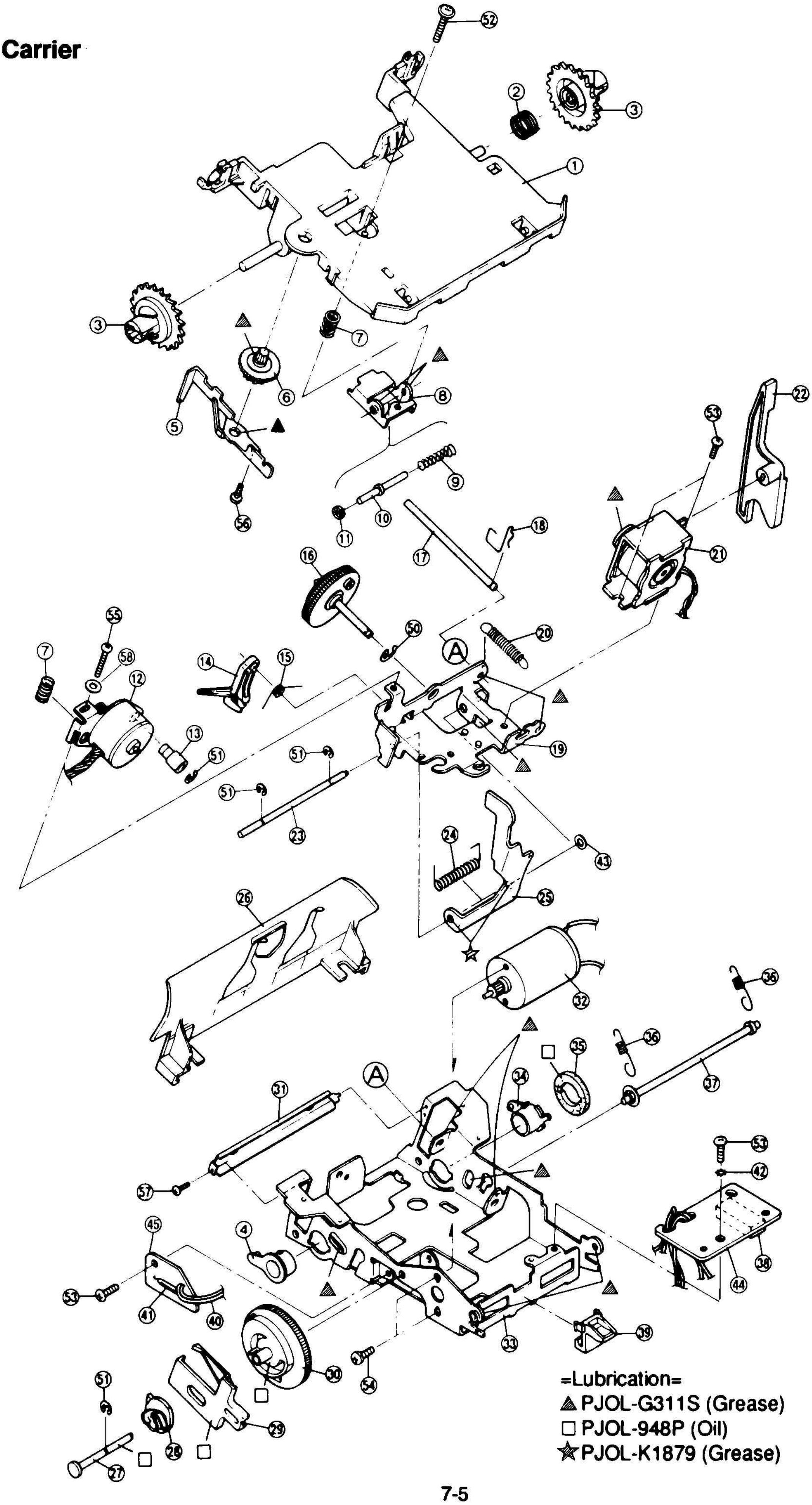
☆ PJOL-G948P (Oil)

✭PJOL-K1879 (Grease)

★ PJOL-SG3451 (Grease)

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
2-1	PJZRXR340M	Platen Assembly	1	
2-2	PJBN27Z	Platen Knob (L)	1	
2-3	PJUB76Z	Paper Release Lever	1	
2-4	PJDJ08261RZ	Platen Bushing (R)	1	
2-5	PJBN28Z	Platen Knob (R)	1	
2-6	PJZH1XR310M	Paper Pan Assembly	1	
2-7	PJDR37Z	Feed Roller	6	
2-8	PJDS7018Z	Spring, Bail Lever	2	
2-9	PJUB75Z	Bail Lever (L)	1	
2-10	PJDF955Z	Bail Shaft	1	
2-11	PJUB61Z	Bail Lever (R)	1	
2-12	PJUL77Z	Paper Releace Plate	1	
2-13	PJDS5108Z	Spring, Paper Release	2	
2-14	PJDF552Z	Carrier Shaft	1	
2-15	PJZHXR340M	Paper Feed Motor Bracket Assembly	1	
2-16	PJVSFR1Z	Reed Switch (SW502)	1	
2-17	PJHE028Z	Magnet	1	
2-18	PJHR9109Z	Magnet Holder	1	
2-19	PJDG5023Z	Paper Feed Gear	1	
2-20	PJMC68Z	Magnetic Shutter	1	
2-21	PJHR549Z	Home Detecting Lever	1	
2-22	PJDS7016Z	Spring, Home Detecting Lever	1	
2-23	PJDS7015Z	Spring, Detent	1	
2-24	PJDE91Z	Detent, Lever	1	
2-25	PJWQ3XR335M	Paper Feed Motor Assembly	1	
2-26	PJJS437Z	Paper Feed Motor Lead	1	
2-27	PJJQ83Z	Carrier Spacing Motor	1	
2-28	PJHG947Z	Mount Rubber, Rear	2	
2-29	PJHG932Z	Mount Rubber, Front	2	
2-30	PJZXXR250M	Gear Cup (Jig)	1	
2-31	PJDD3191Z	Drum Gear	1	
2-32	PJHE5040Z	Drum Gear Shaft	1	
2-33	PJDZ25Z	Carrier Cable	1	
2-34	PJUL78Z	Cable Hanger	1	
2-35	PJDR35Z	Tension Pulley	1	
2-36	PJDY137Z	Tension Pulley Shaft	1	
2-37	PJUL76Z	Tension Arm	1	
2-38	PJDS5164Z	Tension Spring	1	
2-39	PJHR551Z	Cable Holder	1	
2-40	PJJE109Z	Flat Cable	1	
2-41	PJHR533Z	Guide, Paper Feed	1	
2-42	PJZR2XR250M	Bail Roller Kit	2	
2-43	PJUP228Z-C	L.F. Sensor Bare PCB	1	
2-44	PJNW620Z	Plastic Washer	1	
2-45	XUC7FY	E-ring	2	
2-46	XUC3FY	E-ring	1	
2-47	XUC2FY	E-ring	2	
2-48	XWG3F13	Washer	2	
2-49	XTW3 + 12S	Screw 3 x 12 mm	2	
2-50	XTS3 + 13F	Screw 3 x 13 mm	1	
2-51	XTN3 + 6F	Screw 3 x 6 mm	3	
2-52	XTW3 + U6L	Screw 3 x 6 mm	1	
2-53	XTW3 + 5L	Screw 3 x 5 mm	1	
2-54	XYN3 + C4	Screw 3 x 4 mm	2	
2-55	XTW3 + 6L	Screw 3 x 6 mm	2	
2-56	XTS3 + 8F	Screw 3 x 8 mm	1	
2-57	PJDS9253Z	Platen Earth Spring	1	

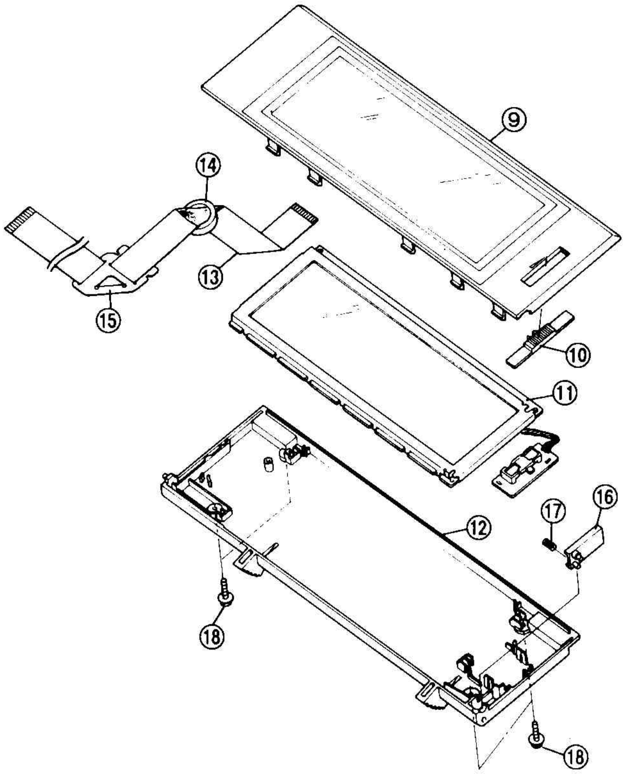
3. Carrier

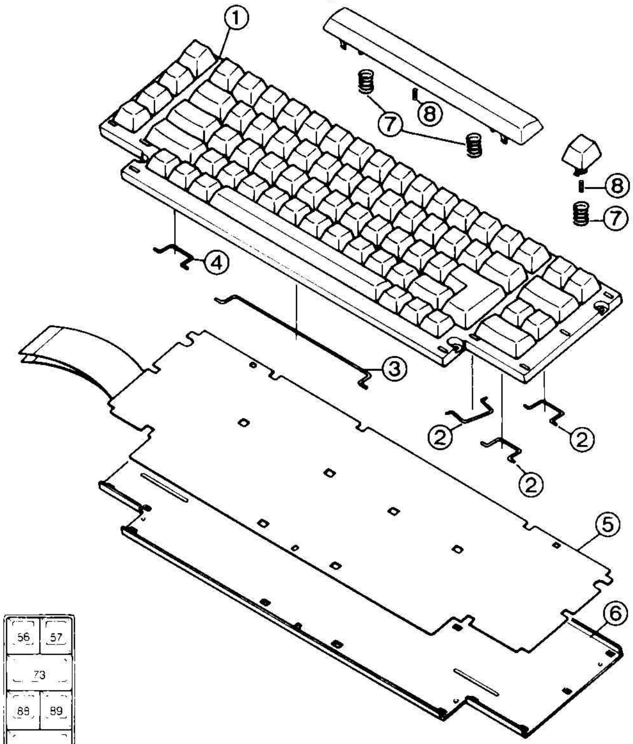


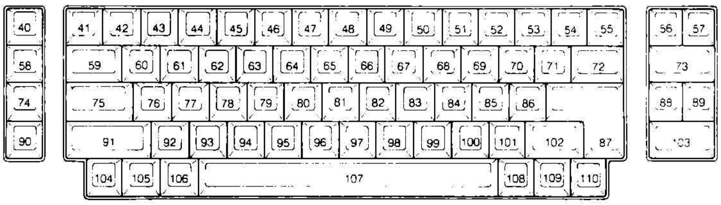
=Lubrication=
▲ PJOL-G311S (Grease)
□ PJOL-948P (Oil)
★ PJOL-K1879 (Grease)

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
3-1	PJZUXR340M	Ribbon Holder Assembly	1	
3-2	PJDS7005Z	Reel Tension Spring	1	
3-3	PJDG5071Z	Correct Reel Gear	2	
3-4	PJDJ08271RZ	Bushing, Carrier (L)	1	
3-5	PJHR548Z	Stop Pawl, Tape Feed	1	
3-6	PJDG5637X	Ribbon Feed Gear	1	
3-7	PJDS5107Z	Spring, Adjust	2	
3-8	PJMD2012Z	Holder, Cam Follower	1	
3-9	PJDS3150Z	Spring, Cam Follower	1	
3-10	PJDY135Z	Cam Follower	1	
3-11	PJHG711Z	Rubber, Cam Follower	1	
3-12	PJWQ1XR335M	Daisywheel Motor Assembly	1	
3-13	PJDJ03051FZ	Wheel Shaft Bushing	1	
3-14	PJHR9103Z	Latch Lever	1	
3-15	PJDS7019Z	Initialize Lever Spring	1	
3-16	PJZG1XR340M	Daisywheel Gear Assembly	1	
3-17	PJDF553Z	Slide Shaft, Carrier	1	
3-18	PJDS9076Z	Clip	1	
3-19	PJMU48Y	Sub Carrier Frame	1	
3-20	PJDS4200Z	Spring	1	
3-21	PJFP29Z	Hammer Solenoid	1	
3-22	PJBD17Z	Daisywheel Release Lever	1	
3-23	PJDY132W	Hammer Shaft	1	
3-24	PJDS7008X	Spring, Hammer	1	
3-25	PJDE92Z	Hammer	1	
3-26	PJZCXR340M	Card Holder Assembly	1	
3-27	PJDY134Z	Shaft, Cam Gear	1	
3-28	PJHR9110Z	Feed Pawl, Ribbon	1	
3-29	PJHR9017Y	Slider, Feed Pawl	1	
3-30	PJZG2R440M	Cam Assembly	1	
3-31	PJMU51Z	Front Support	1	
3-32	PJWQ2XR335M	Ribbon Feed Motor Assembly	1	
3-33	PJMU49Z	Carrier Frame	1	
3-34	PJDJ08251RZ	Bushing, Carrier (R)	1	
3-35	PJHS951Z	Oil Felt	1	
3-36	PJDS4042Z	Spring, Lock Lever	2	
3-37	PJZFXR340M	Lock Bar Assembly	1	
3-38	PJJS430Z	Carrier Connector (CN500)	1	
3-39	PJHR9102Z	Rear Slider	1	
3-40	PJJE68Z	Sensor Lead	1	
3-41	PJVSFR1Z	Reed Switch (SW501)	1	
3-42	XWC3B	Washer	1	
3-43	PJNW310Z	Plastic washer	1	
3-44	PJUP228Z-A	Carrier Bare PCB	1	
3-45	PJUP228Z-B	Ribbon Sensor Bare PCB	1	
3-50	XUCR4FY	E-ring	1	
3-51	XUC2FY	E-ring	4	
3-52	XTW3+U12L	Screw 3×12 mm	1	
3-53	XTN3+6F	Screw 3×6 mm	4	
3-54	XYN3+C4	Screw 3×4 mm	2	
3-55	XTN26+12F	Screw 2.6×12 mm	1	
3-56	XTN26+8G	Screw 2.6×8 mm	1	
3-57	XTN2+4F	Screw 2×4 mm	1	
3-58	XWG25	Washer	1	

4. Keyboard and Display





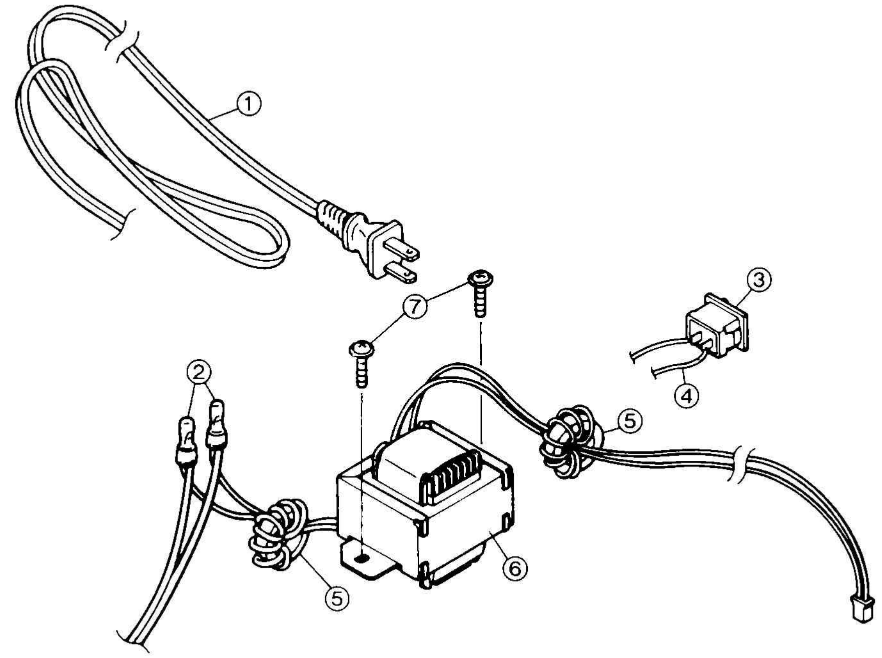


Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
4-1	PJSHX169Z	Keyboard Complete	1	
4-2	PACC3Z	Key Top Support(S)	3	
4-3	PACC1Z	Key Top Support(L)	1	
4-4	PACC2Z	Key Top Support(M)	1	
4-5	PJUP367Z	Keyboard FPC	1	
4-6	PJMD9148Z	Keyboard Frame	1	
4-7	PADS2Z	Key Spring	72	
4-8	PADS1Z	Key Spring	71	
4-9	PJYKW1000M	LCD Front Cover Assembly	1	
4-10	PJBD21Z	Contrast Switch Knob	1	
4-11	PJWDW1000M	Display Unit Complete	1	
4-12	PJYK1W1000M	LCD Rear Cover Assembly	1	
4-13	PJJE148Z	LCD Cable	1	
4-14	PJJN8Z	ES Core	1	
4-15	PJHG514Y	Cable Clamp	1	
4-16	PJHR582Z	LCD Support	1	
4-17	PJDS5076Z	LCD Support Spring	1	
4-18	XTW3+10SFZ	Screw 3x10 mm	4	

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
4-40	PABZ72Z	Key Top, L MAR	1	
4-41	PABZ73Z	Key Top, MAR REL	1	
4-42	PABZ3Z	Key Top, 1 !	1	
4-43	PABZ4Z	Key Top, 2 @	1	
4-44	PABZ5Z	Key Top, 3 #	1	
4-45	PABZ6Z	Key Top, 4 $	1	
4-46	PABZ7Z	Key Top, 5 %	1	
4-47	PABZ8Z	Key Top, 6 ¢	1	
4-48	PABZ9Z	Key Top, 7 &	1	
4-49	PABZ10Z	Key Top, 8 *	1	
4-50	PABZ11Z	Key Top, 9 (	1	
4-51	PABZ12Z	Key Top, 0)	1	
4-52	PABZ13Z	Key Top, – —	1	
4-53	PABZ14Z	Key Top, = + ´ `	1	
4-54	PABZ15Z	Key Top, BACK SPACE	1	
4-55	PABZ16Z	Key Top, FWD	1	
4-56	PABZ398Z	Key Top, NEXT PAGE PREVIOUS	1	
4-57	PABZ18Z	Key Top, PRINT	1	
4-58	PABZ19Z	Key Top, R MAR	1	
4-59	PABZ399Z	Key Top, TAB D TAB	1	
4-60	PABZ21Z	Key Top, Q	1	
4-61	PABZ401Z	Key Top, W XX XX	1	
4-62	PABZ402Z	Key Top, E EMBED	1	
4-63	PABZ403Z	Key Top, R RMF	1	
4-64	PABZ404Z	Key Top, T APPEND	1	
4-65	PABZ26Z	Key Top, Y	1	
4-66	PABZ405Z	Key Top, U XX XX	1	
4-67	PABZ406Z	Key Top, I P INDENT	1	
4-68	PABZ29Z	Key Top, O	1	
4-69	PABZ407Z	Key Top, P STOP	1	
4-70	PABZ31Z	Key Top, 1/2 1/4 β ç	1	
4-71	PABZ32Z	Key Top, £ £ ¨ ^	1	
4-72	PABZ33Z	Key Top, ⌫	1	
4-73	PABZ34Z	Key Top, ⇧	1	
4-74	PABZ35Z	Key Top, TAB SET	1	
4-75	PABZ408Z	Key Top, LOCK CAPS	1	
4-76	PABZ409Z	Key Top, A AUTO	1	
4-77	PABZ410Z	Key Top, S SEARCH	1	
4-78	PABZ39Z	Key Top, D	1	
4-79	PABZ411Z	Key Top, F FIND	1	
4-80	PABZ41Z	Key Top, G	1	
4-81	PABZ412Z	Key Top, H HALF SP	1	
4-82	PABZ413Z	Key Top, J MICRO SP	1	
4-83	PABZ44Z	Key Top, K	1	
4-84	PABZ414Z	Key Top, L CHG. FORM	1	
4-85	PABZ46Z	Key Top, ; :	1	
4-86	PABZ47Z	Key Top, ' "	1	
4-87	PABZ48Z	Key Top, RETURN	1	
4-88	PABZ49Z	Key Top, ⇐	1	
4-89	PABZ50Z	Key Top, ⇒	1	
4-90	PABZ51Z	Key Top, TAB CLR	1	
4-91	PABZ52Z	Key Top, SHIFT	1	
4-92	PABZ53Z	Key Top, Z	1	
4-93	PABZ400Z	Key Top, X REPLACE	1	
4-94	PABZ415Z	Key Top, C CENTER	1	
4-95	PABZ56Z	Key Top, V	1	
4-96	PABZ416Z	Key Top, B BOLD	1	
4-97	PABZ58Z	Key Top, N	1	

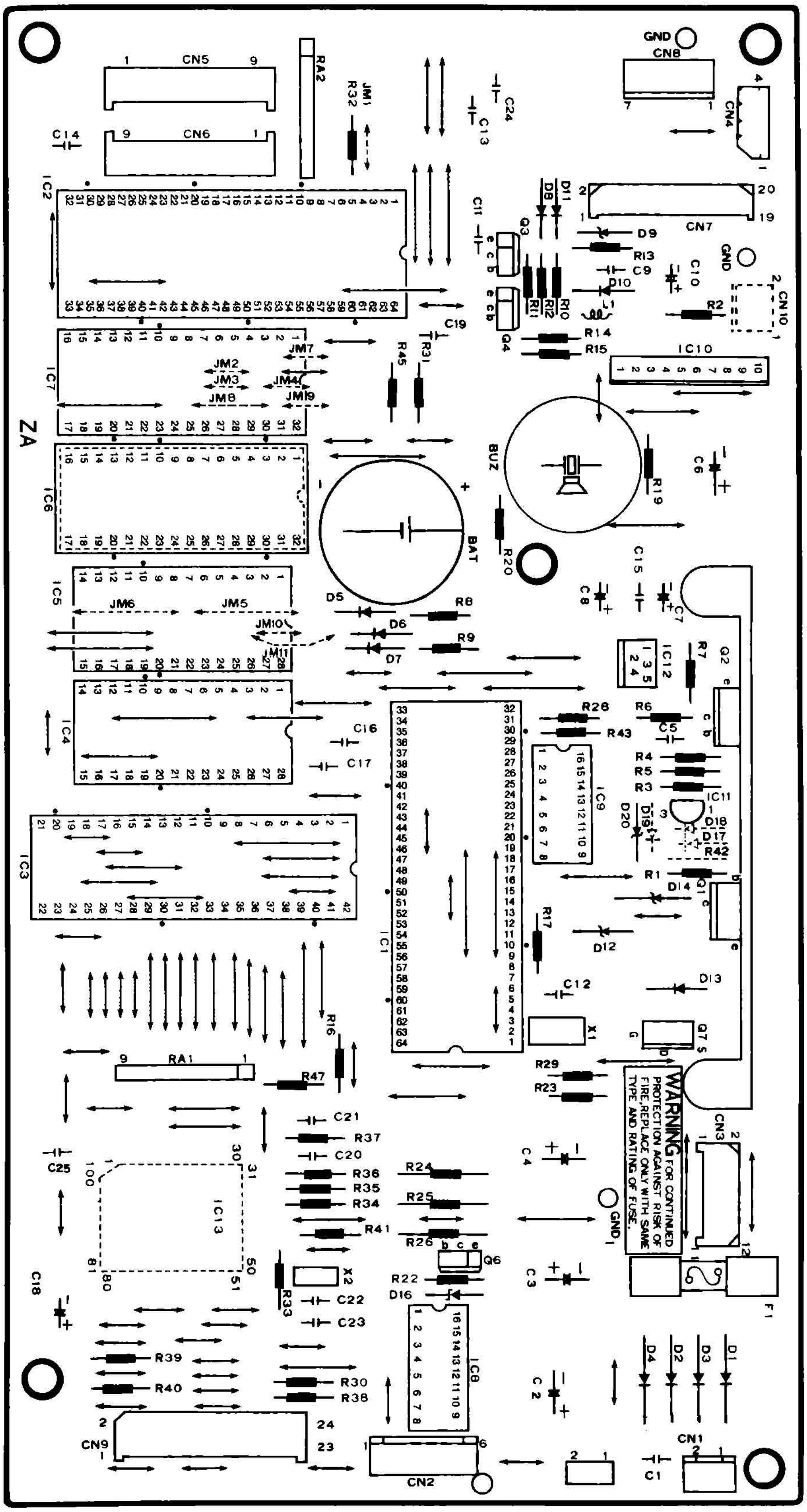
Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
4-98	PABZ417Z	Key Top, M	1	
4-99	PABZ60Z	Key Top, , , ¡	1	
4-100	PABZ61Z	Key Top, . . ¿	1	
4-101	PABZ62Z	Key Top, / ? ~	1	
4-102	PABZ63Z	Key Top, SHIFT	1	
4-103	PABZ64Z	Key Top, ⇩	1	
4-104	PABZ65Z	Key Top, ⤒	1	
4-105	PABZ418Z	Key Top, CODE	1	
4-106	PABZ67Z	Key Top, RPT	1	
4-107	PABZ68Z	Key Top, SPACE	1	
4-108	PABZ419Z	Key Top, RELOC EXP	1	
4-109	PABZ70Z	Key Top, QUICK ERASE	1	
4-110	PABZ71Z	Key Top, ⤓	1	

6. Power Supply



Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
6-1	PJJA83Z	AC Cord	1	⚠
6-2	PJJT68Z	Closed End Connector	2	⚠
6-3	EST2011B	Power Switch	1	
6-4	PJJE149Z	Power Switch Lead	1	
6-5	PJJN9Z	ES Core	2	
6-6	PJLT5L22	Power Transformer	1	⚠
6-7	XTW3 + 12S	Screw 3 × 12 mm	2	

7. Main Logic Board



(Parts Side View)

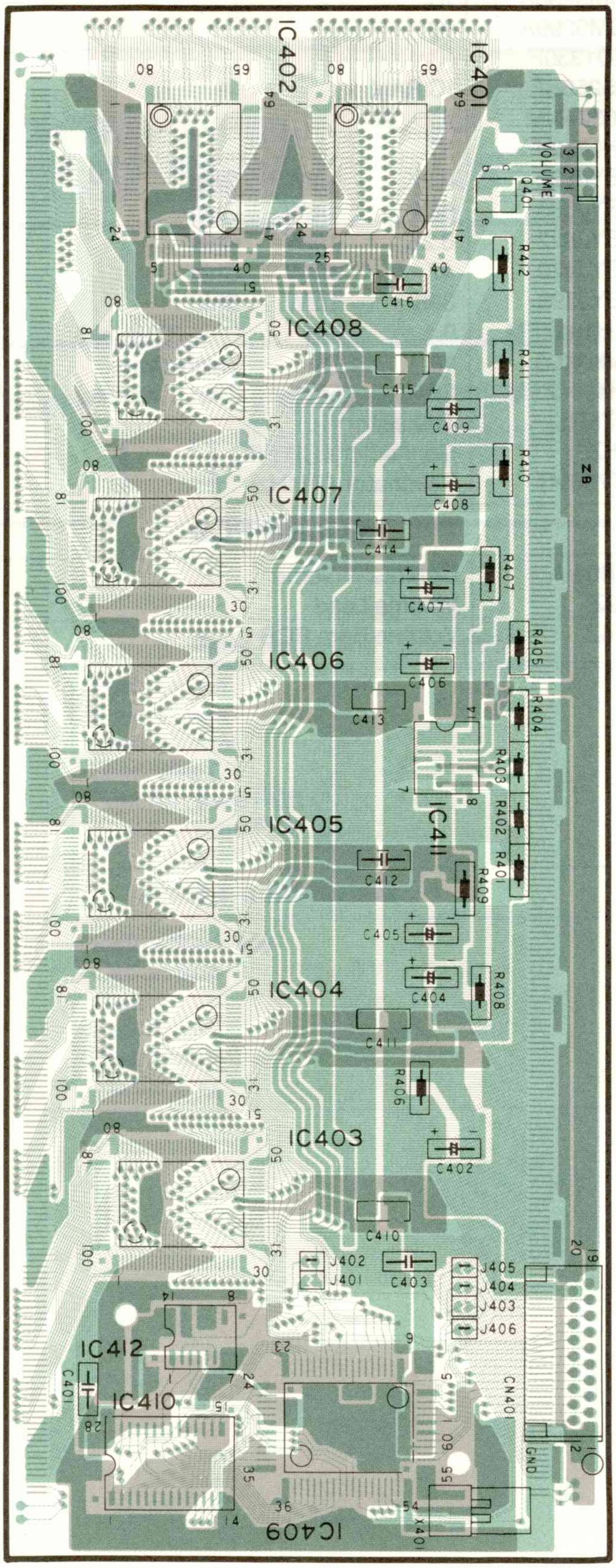
JM2, JM3, JM5, JM8 and JM10 are installed.

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
Integrated Circuit, Transistors and Diodes				
IC1	PJVIHD63B3XP	IC	1	
IC2	PJVIMB624165	IC	1	
IC3	PJVIM6364MA	IC RAM	1	
IC4,5	PJVIT51832PL	IC RAM	2	
IC6	PJWI2W1000M	IC ROM	1	
IC7	PJWI1W1000M	IC ROM	1	
IC8	PJVITD62064	IC	1	
IC9	PJVIBA12003	IC	1	
IC10	PJVITA7288P	IC	1	
IC11	PJVIM5236L	IC	1	
IC12	PJVIL78LR05C	IC	1	
IC13	PJVITC8566AF	IC	1	
D1-4	PJVDRL253	Diode	4	
D5-8,10,11	PJVD1S2076	Diode	6	
D9	PJVD05AZ20	Diode (Zener)	1	
D12,16	PJVD05AZ24	Diode (Zener)	2	
D13	PJVD1N4003	Diode	1	
D14	MA2240LF	Diode (Zener)	1	
D20	PJVD05AZ12	Diode (Zener)	1	
Q1	2SA1470S	Transistor	1	
Q2	2SB1140ST	Transistor	1	
Q3	2SC2021MS	Transistor	1	
Q4	2SA937MS	Transistor	1	
Q6	2SB909MQR	Transistor	1	
Q7	2SK1059	Transistor	1	
Resistors				
R1,6	ERD25FJ221	220 1/4W Carbon	2	S
R2	ERD25FJ183	18K 1/4W Carbon	1	S
R3,36	ERD25FJ153	15K 1/4W Carbon	2	S
R4	ERO25TKD8661	8.66K 1/4W Metal	1	
R5	ERO25TKD1001	1K 1/4W Metal	1	
R7	ERD25FJ470	47 1/4W Carbon	1	S
R8	ERD25FJ331	330 1/4W Carbon	1	S
R9	ERD25FJ122	1.2K 1/4W Carbon	1	S
R10	ERD25FJ152	1.5K 1/4W Carbon	1	S
R11	ERD25FJ332	3.3K 1/4W Carbon	1	S
R12,33	ERD25FJ105	1M 1/4W Carbon	2	S
R13	ERD25FJ220	22 1/4W Carbon	1	S
R14	ERD25FJ473	47K 1/4W Carbon	1	S
R15,22,28	ERD25FJ223	22K 1/4W Carbon	3	S
R16,29-32	ERD25FJ103	10K 1/4W Carbon	5	S
R17,19,38-41	ERD25FJ472	4.7K 1/4W Carbon	6	S
R20,45	ERD25FJ101	100 1/4W Carbon	2	S
R23	ERD25FJ561	560 1/4W Carbon	1	S
R24,25	ERX2SJ8R2S	8.2 2W Metal	2	
R26	ERG2SJ121S	120 2W Metal	1	
R34,37	ERD25FJ102	1K 1/4W Carbon	2	S
R35	ERD25FJ683	68K 1/4W Carbon	1	S
R43	ERD25FJ222	2.2K 1/4W Carbon	1	S
R47	ERD25FJ103	10K 1/4W Carbon	1	S
RA1	EXBP88472K	Resistor Array (4.7K × 8)	1	
RA2	ERBP88103K	Resistor Array (10K × 8)	1	

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
Capacitors				
C1	ECKD1H103ZF	0.01 50V Ceramic	1	S
C2-4	ECEA1ESS332	3300 25V Electrolytic	3	
C5	ECKD1H102KB	1000P 50V Ceramic	1	S
C6	ECEA1CSS472	4700 16V Electrolytic	1	
C7	ECEA1HUR33	0.33 50V Electrolytic	1	
C8,18	ECEA0JU102	1000 6.3V Electrolytic	2	
C9	ECKD1H561KB	560P 50V Ceramic	1	S
C10	ECEA1EU100	10 25V Electrolytic	1	
C11,12	ECKD1H103ZF	0.01 50V Ceramic	2	S
C13,14	ECFD1E104ZF	0.1 25V Semi-Conductor	2	S
C15	ECKD1H103ZF	0.01 50V Ceramic	1	S
C16,17,19,25	ECFD1E104ZF	0.1 25V Semi-Conductor	4	S
C20	ECQM1H102JV	1000P 50V Polyester	1	
C21	ECQM1H103JV	0.01 50V Polyester	1	
C22,23	ECCD1H330JC	33P 50V Ceramic	2	
C24	ECKD1H103ZF	0.01 50V Ceramic	1	S
Other Parts				
BAT	BR2325-1HC	Lithium Battery	1	
BUZ	PJSCPKM22EPP	Buzzer	1	
CN1	PJJP37Z	Connector, Power Transformer	1	
CN2	PJJP40Z	Connector, SP.Motor	1	
CN3	PJJS419Z	Connector, Carrier	1	
CN4	PJJP123Z	Connector, LF. Motor	1	
CN5,6	PJJP261Z	Connector, Keyboard	2	
CN7	PJJS397Z	Connector, LCD	1	
CN8	PJJS523Z	Connector, Control Panel	1	
CN9	PJJS522Z	Connector, FDD	1	
F1	XBA1C30NU100	Fuse 125V 3A	1	⚠
L1	PELQLHL6222J	Coil	1	
PB1	PJWPW1000M	Main PCB Complete	1	*
X1	PJVCST700MT	Resonator (7 MHz)	1	
X2	PJCSA16.00M	Resonator (16 MHz)	1	
7-1	XTB3 + 8J	Screw 3 × 8 mm (for Transistor)	2	
7-2	XTW3 + 8S	Screw 3 × 8 mm (for Heat Sink)	2	
7-3	XWC3B	Washer	2	

CAUTION:
The lithium battery is a critical component (type No. BR2325-1HC).
Please observe proper polarity and exact location when replacing it.

8. LCD Board and Volume Board

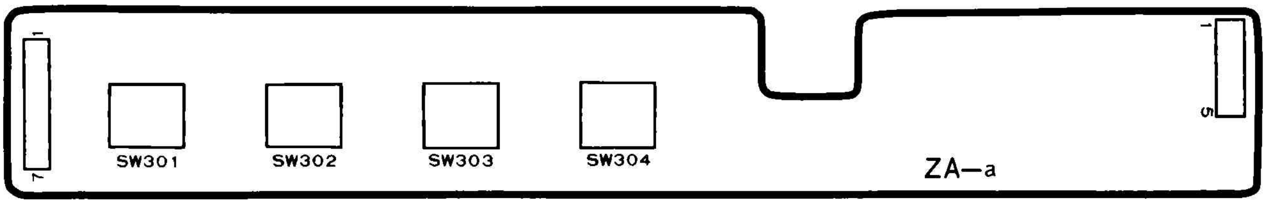


(Parts Side View)

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
IC401,402	PJVIMSM5298A	IC	2	
IC403-408	PJVIMSM5299A	IC	6	
IC409	PJVISED1330F	IC	1	
IC410	PJVIH65256BF	IC RAM	1	
IC411	PJVILA6324NM	IC	1	
IC412	PJVI74HC00AF	IC	1	
R401,402	ERJ8GEYJ822	8.2K 1/8W Chip	2	
R403	ERJ8GEYJ683	68K 1/8W Chip	1	
R404,405	ERJ8GEYJ822	8.2K 1/8W Chip	2	
R406-411	ERJ8GEYJ470	47 1/8W Chip	6	
R412	ERJ8GEYJ393	39K 1/8W Chip	1	
C401,403,412	ECUM1H104ZFM	0.1 50V Chip (Ceramic)	3	
C402,404-409	ECEA1VKA100	10 35V Electrolytic	7	
C414,416	ECUM1H104ZFM	0.1 50V Chip (Ceramic)	2	
Q401	2SA1037KRS	Transistor	1	
CN401	PJJS476Z	Connector,LCD FFC	1	
X401	PJVCST700MT	Resonator (7 MHz)	1	
Volume PCB				
VR401	PJVV14B04-A	Contrast Volume	1	
8-1	PJJE152Z	Volume Lead	1	
8-2	PJUP314Z	Volume Bare PCB	1	

10. Function Board and Packing Materials

(A)



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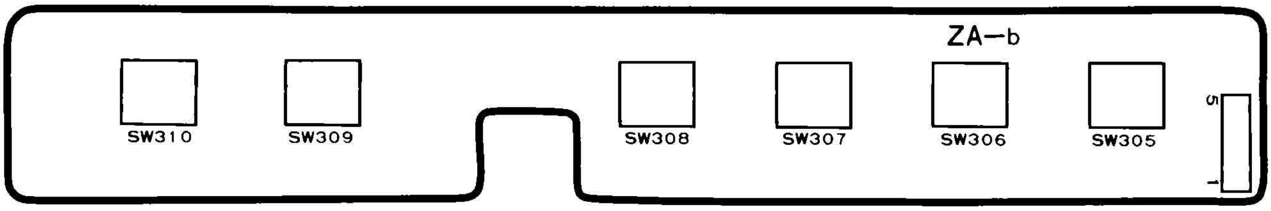

(Parts side view)

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
SW301-304	EVQQS205K	Push Switch	4	
SW305-310	EVQQS205K	Push Switch	6	
10-1	PJJE150Z	Lead Wire (5P)	1	
10-2	PJJE151Z	Lead Wire (7P)	1	
10-3	PJUP313Z-A	Function Bare PCB (A)	1	
10-4	PJUP313Z-B	Function Bare PCB (B)	1	
Packing Materials				
P1	PJQX5871Z	Instruction Book	1	
P2	PJPG635Z	Carton Box	1	
P3	PJPN344Z	Pad(L)	1	
P4	PJPN345Z	Pad(R)	1	
P5	PJPN361Z	Pad (Bottom)	1	
P6	PJPE193Z	Plastic Bag	1	

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